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BACTERIOLOGICAL EXAMINATIONS OF THE CONJUNCTIVAL SAC IN TYPHOID FEVER AND IN PNEUMONIA.

BASED UPON AN EXAMINATION OF 100 CASES OF TYPHOID FEVER AND 48 CASES OF LOBAR PNEUMONIA OCCURRING IN THE WARDS OF THE JOHNS HOPKINS HOSPITAL.

By Robert L. Randolph, M. D.

The study of the bacterial flora of the conjunctival sac in health and disease has been the subject of many investigations, but it has left still unsolved many problems of interest and importance. The nature of the infection and the mode of not a few conjunctival infections are unsettled. There are several ways by which microorganisms can gain access to the conjunctiva, viz.: (1) From the exterior either through air infection, through dust or droplets, or by direct contact; (2) from the throat and nose by way of the naso-lacrymal duct; (3) by the blood circulation either directly to the conjunctiva or by elimination of microorganisms in the secretion of the lacrymal glands; (4) by the lymphatics, and (5) by direct extension from infection of neighboring parts. In many instances it is often difficult or impossible at present to determine by which of these various paths the infection has been conveyed.

We are also, in some cases, in doubt either as to the nature or the source of the specific organism concerned in the infection. Here a question of much interest relates to the relative frequency of conjunctival infections by the microorganisms causing a primary infection elsewhere or by secondary invaders. For a considerable number of diseases it has been demonstrated that the bacteria of the primary disease may cause also an associated conjunctival infection. This is true of gonorrhœa, cerebrospinal meningitis, pneumonia, diphtheria, influenza, tuberculosis, erysipelas, pyæmia, septicæmia, bubonic plague, Malta fever and leprosy, but in the case of some, at least, of these affections a complicating conjunctivitis is due more frequently to secondary invaders than to the bacterium causing the primary disease. As regards the inflammations of the mucous membranes including the conjunctiva which so often complicate scarlet fever, small pox, measles, and other exanthematous fevers, our inability to demonstrate satisfactorily the specific parasites of these diseases makes it impossible at present to state positively, whether they are in any degree directly responsible for such inflammations. Without denying the possibility of the direct participation of these unknown microorganisms in the complications in question, the existing evidence favors the view that secondary invaders are the chief excitants of this class of affections, *Streptococcus pyogenes* being most frequently concerned. Other secondary invaders to be reckoned with in these cases of conjunctivitis are the pneumococcus, the pyogenic staphylococcus, influenza, and pseudo-influenza bacilli, xerosis and other pseudo-diphtheria bacilli. It is probable that in most instances these bacteria were not introduced from without, but being already present in the throat, nose or conjunctiva were enabled to multiply and produce their pathogenic effects in consequence of lowered resistance resulting from the primary infection. This latter interpretation of the facts, which is the

one generally held, renders of especial interest the examination of the bacterial flora of the normal conjunctival sac.

Several years ago I reported the results of my bacterial examinations of the normal conjunctiva of 100 persons. In 88 per cent *M. albus*, the ordinary skin coccus, was recovered in culture from the conjunctival sac, and subsequent examinations have convinced me that this organism is a regular inhabitant of the normal conjunctiva. The genuine *M. aureus*, which has been found frequently by some others in this situation, I have encountered only in a small minority of cases, and I must believe that there has been some error in identification by those who claim that it is frequently present. The frequency with which certain other bacteria are found in the conjunctival sac will doubtless depend upon the technique employed. This is true especially of influenza bacilli, the Koch-Weeks bacillus, the Morax-Axenfeld diplobacillus, certain pseudo-diphtheria bacilli, and in a measure the pneumococcus which grow best upon media of special composition. In opposition to Gasparrini and more in accord with Oertzen, Axenfeld, Lawson, and the majority of investigators, I have found the pneumococcus in only one or two per cent of normal conjunctivæ.

As a small contribution to the solution of certain of the problems indicated I have undertaken the bacteriological examination of the conjunctival sac in a series of cases of typhoid fever and of pneumonia.

The occurrence of the typhoid bacillus in the blood, urine, sputum and fæces of patients with typhoid fever, or, in other words, the wide distribution of this bacillus throughout the body in this disease added to its resisting powers and ready adaptation to its environment suggests the possibility of the occasional appearance of the bacillus also in the conjunctival sac. Conjunctivitis is a recognized complication of typhoid fever, but while the search for the typhoid bacillus is of especial interest in this complication, it might readily be that the bacillus occasionally gained access to the conjunctiva without exercising any injurious effect. Although rare in contrast to otitis media, conjunctivitis is not an uncommon complication of acute pneumonia.

The following method was employed in making the cultures. Through the cotton plug of a test tube containing one cubic centimeter of sterile bouillon ran a glass rod, on which was tightly wrapped some cotton wool, thus making a swab. This rod, with the plug, was removed at the bedside, and both conjunctival sacs above and below were well swabbed, care being taken not to touch the lids and lashes. Then, with a pair of sterile forceps, the lower end of the rod just above the swab was broken off and dropped back into the bouillon at the bottom of the tube. It is hardly necessary to say that before the tube was opened everything within it had been thoroughly sterilized. The plug was then replaced and the tube taken over to the laboratory. The usual quantity of fluid agar for a plate culture was poured into this tube and well shaken up and plate cultures made in the usual manner in Petri dishes and placed in the oven at a temperature of 35 C. - 37 C. The interval of time between the inoculation of the bouillon and the pouring of the plates never exceeded fifteen minutes, and was usually less. In this manner inoculations were made from 100 cases of typhoid fever and 48 cases of lobar pneumonia. I might say that the inoculations were never made from any but undoubted cases of typhoid fever, that is to say, from individuals with continued fever with "positive Widal" and with other characteristic signs and symptoms of this disease. Cases in any respect doubtful were not utilized. The predominant colony in the plates was almost always *Micrococcus albus*, and familiarity with its appearance obviated the necessity of making cover slips from each colony in the plate. Frequent examinations, however, were made even from these round white colonies to assure me that my interpretation was correct. Whenever a colony showed the slightest deviation from what I have learned to expect in the appearance of this organism in plate culture cover slips were made, and if necessary the organism was subjected to the proper cultural tests.

In glancing over the findings one must be surprised at the frequency with which *M. albus* comes to the front. This organism occurred in the typhoid cases 59 times alone: in other words, there was no other organism in the plate. It actually thus occurred oftener, for in one case (Case 24) inoculations were made on nine different occasions and *M. albus* was found six times, while in the remaining three times it was found six with *M. aureus*. The same should be said of Case 78, in which it was thought proper to make inoculations every day for three weeks. Inoculations were made from this patient 18 times, and in only four instances did *M. albus* fail to appear. Not counting these two cases *M. albus* was found associated with other bacteria in 23 cases, so that out of the 100 cases this organism was found 82 times. In eight cases *M. aureus* was found alone, while in 13 cases it was found associated with other bacteria, in two out of the 13 with *M. albus*. *Streptococcus pyogenes* was found three times, and in two of these cases along with *M. albus*. The Morax-Axenfeld diplobacillus was found once and was associated with *M. albus*. The xerosis bacillus was found three times, and in two of these cases was associated with *M. albus*. *B. pyocyaneus* occurred once. *B. subtilis* occurred four times and in three of these along with *M. albus*. The plates were sterile in two cases, and in two others impurities predominated to such an extent as to make the observation worthless. Out of the 100 cases then the conjunctival sac was found to contain bacteria in 96. What is remarkable is that the typhoid bacillus was absent throughout. There were three cases of conjunctivitis, and inoculations made from the conjunctiva showed in two instances *M. albus*, and in the other case *M. albus* and *M. aureus*.

In the other series 48 cases of lobar pneumonia were examined, and in these cases *M. albus* was found alone in 24 cases, and along with other bacteria 14 times; in other words, this organism was found in 38 out of 48 cases. The pneumococcus was found twice, once alone and once along with *M. albus*. *B. subtilis* was found three times alone and once along with *M. albus*. *M. aureus* occurred 10 times, once alone and nine times associated with *M. albus*. There were three sterile

plates in this series. The Morax-Axenfeld diplobacillus was found once and the xerosis bacillus once. In five cases there was conjunctivitis, and inoculations from three of these five cases showed only *M. albus*, one showing *M. aureus* and the remaining one the pneumococcus. In a few instances there appeared an occasional colony of some unidentified bacterium of no apparent significance.

The question naturally arose in the course of these observations, whether the typhoid bacillus might not be found at some particular stage of the disease, and this question was answered by making the inoculations at different stages of the fever. In one case (Case 78) inoculations were made practically every day throughout the course of the disease, and even in convalescence attempts were repeatedly made to recover the organism from the conjunctival sac, but always with negative results. As regards the pneumonia cases the pneumococcus was found twice, and in one of the patients its presence was associated with a conjunctivitis. The conjunctival sac in pneumonia must be regarded then as a very unlikely place in which to find the pneumococcus.

My own investigations into the bacterial flora of the conjunctival sac, not only in healthy individuals, but in those under the influence of a general infection, as, for instance, typhoid fever, have resulted so consistently in the discovery of one organism that I am confirmed in the belief that this organism is an invariable inhabitant of the conjunctival sac, and that among the defensive mechanisms, either by its numerical superiority or by its products, it may aid in rendering this part of the body a soil unfavorable for the growth and multiplication of those bacteria which are regarded as especially pathogenic for the eye and which occasionally find their way into this location oftener, I believe, than is generally thought. The possibility is suggested then that this organism, slightly pathogenic and quite numerous in the conjunctival sac, gives rise to conditions which are antagonistic to such organisms, for instance, as *B. diphtheriæ*, the gonococcus, Koch-Weeks' bacillus and the organism of trachoma, whatever that may be. What a very common disease is gonorrhœa, and yet how comparatively infrequent is gonorrhœal ophthalmia. It can hardly be otherwise that the gonorrhœal virus gains access to the conjunctival sac without setting up inflammation, and it must happen that in cases of highly infectious inflammation of one eye infectious germs are often conveyed to the other eye without resulting injury. It is true, as I have shown elsewhere, that an intact epithelium is a great safeguard against infection of the conjunctiva, but the frequency with which *M. albus* is found in the conjunctival sac leads me to think that this organism in this location plays the part of an enemy to many invaders. The antagonism which exists between certain organisms or the inhibitory influence which some bacteria exert upon the growth of others is a familiar and well established fact. In this connection I am reminded of the observations of Menge and Krönig,[1] who introduced into the vagina 23 times *B. pyocyaneus*, 30 times *M. aureus*, and 27 times *Streptococcus pyogenes*. The staphylococcus was obtained from a breast abscess, the streptococcus came from the purulent exudate found in the abdominal cavity of a woman who had died of an acute septic peritonitis. *B. pyocyaneus* was obtained from green pus. There was no doubt then that these bacteria possessed virulence and freshness in a high degree. No trace of these organisms could be found in the vaginal tract after 26 hours. The conditions then in the normal vaginal canal for the development of pathogenic bacteria are unfavorable, conditions probably due to a considerable extent to the presence in the canal of *B. vaginalis Doederlein*, which organism, Doederlein holds, is largely responsible for the peculiar reaction of the vaginal secretion, a reaction which helps to keep sterile this part of the genital apparatus, that is to say, sterile so far as its freedom from pathogenic bacteria is concerned. It has been observed in large obstetric wards that fever was more often seen in women in whom the effort was made to disinfect the vaginal canal by means of the so-called chemical disinfectants, than in women in whom no such attempt had been made. Efforts to disinfect the alimentary canal through the same means are equally futile, and when made, are frequently followed by distressing symptoms. Attempts to render the conjunctiva sterile have equally failed.

CONCLUSIONS.

The bacterial flora of the conjunctival sac during typhoid fever and pneumonia shows practically no difference from the conjunctival flora of individuals who are in perfect health.

It does not seem unreasonable to suggest that the exposed mucous surfaces throughout the body are inhabited by bacteria which perform for their resting place functions of a protective character by making the surroundings uncongenial to bacteria of other kinds.

[1] Bakteriologie des weiblichen Genitalkanales, S. 68.

TUBERCULOSIS WORK IN EUROPE.[1]

BY JOSEPH WALSH, M. D.

At the International Congress of Tuberculosis held in Paris last October there were over 3000 delegates from all parts of the world.

Discussion revealed no new method or specific in the treatment of tuberculosis, and it was generally agreed that sufficient rest, sufficient fresh air and sufficient good nourishment were the only elements in the treatment at present known to science.

The official seal, as it were, of the Congress was put on

[1] Read before the Lænnec Society, March 21, 1906.

various efforts towards the cure and prevention of tuberculosis namely, sanatoria for adults and for children, hospitals for advanced cases, supporting dispensaries, park convalescent camps (day camps) and societies for the education of the public. In addition to hearing the discussions as to the work done in the various countries I had the pleasure of investigating, personally, the work done in England, France and Germany.

Sanatoria are found in all the countries of Europe. The greatest number of them are found in Germany where the sanatorium idea originated, the smallest number in France, the natural antagonist to Germany and German ideas.

The first sanatorium in the world was founded by Brehmer at Gœbersdsorf about 1860, and it is within the last forty years that sanatoria have sprung up elsewhere.

It is interesting to note that the first man in our own country to advocate the curability of tuberculosis, namely Benjamin Rush, was ably seconded by the greatest layman of his time, namely, Benjamin Franklin; and again that the foundation of Brehmer's Sanatorium was largely due to the greatest layman of fifty years ago, namely, Alexander von Humboldt. The layman has had his hand in the crusade against tuberculosis from the beginning; his aid is now recognized to be definitely necessary; it ought not to be difficult to obtain.

The Germans believe the purpose of the sanatorium to be threefold. (1) The cure of the patient. (2) The education of the patient in the way of prevention in order to avoid further contagion. (3) The prevention of further contagion on the part of the patient for the time he is in the sanatorium.

The German sanatoria have been built regardless of cost and are magnificently endowed.

England possesses the next largest number of sanatoria and these are surpassed in magnificence only by those in Germany itself. Like in Germany no money has been spared on the building of English sanatoria, but there the funds have stopped, and there is not a sanatorium on the island that does not show a woeful lack of means for maintenance.

On account of the lack of maintenance English sanatoria are very much hampered in their work. Whatever maintenance they have is kept up by means of subscribers. Depending on the amount of the subscription each subscriber has the right to send one or several cases a year to the sanatorium. The sanatoria are, therefore, practically obliged to take cases even when they are unsuitable. Moreover the subscriber demands the admission of his full quota of cases yearly, thereby making the stay of the individual patient short. A common stay is six weeks, and it is uncommon to keep a patient more than three months.

This method of subscription and its *quid pro quo* seems to be pretty thoroughly rooted in England. We all remember in our novels of English life how the landed proprietor of the village, if he built a church, insisted that his family should always retain the right to name the rector.

On account of the unsuitableness of the cases and the shortness of their stay results in individual cases are not very good. Moreover the length of time the patient is kept under control thereby preventing further infection in the home is insignificant. Consequently in England the purpose of the sanatorium is considered to be merely educational.

France with her natural antagonism to Germany succeeded in bringing arguments against the usefulness of sanatoria until within these last ten years. Among other things, the French schools insisted that contagion practically always took place about the family hearth in childhood and when the disease broke out in the adult, the patient's resistance was exhausted and the likelihood of cure small. Moreover, by this time he had done practically all the damage in the way of contagion that was worth while considering. The French, therefore, directed all their efforts to the prevention of tuberculosis in the child and to the treatment of the child. I think it is safe to say that they have more sanatoria for children throughout France than in all other countries combined. Their marine sanatoria for the cure of tuberculosis in children are the best known in the world.

While, therefore, antagonizing Germany they developed a new and important phase of the crusade against tuberculosis, namely, the care of the children, and by coming eventually around to sanatoria for adults they furnished the best proof of their usefulness and importance.

On account of our geographical position and our mental attitude towards the rest of the world, the United States stands in an especially favorable position for the development of new ideas. We are reasonably quick at taking up new ideas and taking them up without prejudice. It is not strange, therefore, that the sanatorium in the United States developed along more rational lines and that as a consequence the results accomplished are the best in the world. We consider the purpose of the sanatorium twofold, namely, first the cure of the patient, second the education of the patient and his friends.

The objection to the public charity sanatoria in Germany is their extreme elaborateness and the lack of enthusiasm of the men usually in charge of them. In the United States we have not yet gotten beyond the stage where each sanatorium still remains under the control of the enthusiasm that built it. On account of the number of sanatoria in Europe compared with the United States they have better control of the general tuberculosis situation but I believe are behind us in individual results.

The private sanatoria that I visited in Germany were Brehmers and Rompler's at Gœbersdsorf, Hohenhonnef, Falkenstein and Rupertshaim. Brehmer's ideas and his energy in pushing them deserve to put him in the position he occupies in connection with tuberculosis work.

Brehmer's idea was that fresh air was the principal element in the cure and that exercise was a powerful adjunct. It was the dictum of the century before when Sydenham insisted that the outside of a horse was good for the inside of a man. From the time of entrance to the sanatorium, Brehmer put his patients on mountain climbing. The grounds of Brehmer's sanatorium consist of a most beautiful park on a rather steep mountain side traversed by walks among trees

and rocks, here cut through a small tunnel, there beautified by a fountain surrounded by nymphs, the whole charming as enthusiasm could make it. Despite the progress in the treatment of tuberculosis Brehmer's ideas continue to be carried out most religiously. Patients are still put on exercise from the moment of entrance practically regardless of the disease condition present.

The next step in the treatment of tuberculosis after fresh air, was introduced by Detweiler, who realized that exercise instead of being an adjunct was in many cases harmful. The indications for and against exercise not being properly understood, Detweiler put all patients on rest and kept them on rest.

Exactly across the street from Brehmer's sanatorium is a sanatorium founded by Rompler, a follower of Detweiler. Rompler, too, is dead but Rompler's ideas still hold sway and in Rompler's sanatorium, though the patients may stay for a year, they practically never get off their steamer chairs. The grounds around Rompler's sanatorium are quite as beautiful and quite as suitable for exercise as those about Brehmer's though they are never used.

Moreover though the idea as to the necessity for unlimited fresh air still remains, the private sanatoria in Germany presented the greatest inducements to remain in-doors. In Falkenstein, in Rompler's and in Brehmer's they have the most beautiful reception rooms, reading rooms, libraries, closed winter gardens, etc., in each of which a certain number of patients can be constantly found.

In the private sanatoria are seen no arrangements for sleeping out-of-doors, on balconies or the like, and whether the windows are left open at night or not depends to a considerable extent on the whim of the patient. In the charity sanatoria throughout Europe arrangements are most complete for sleeping on balconies or sleeping in very open wards, but in the private sanatoria though fresh air is insisted on theoretically it does not seem to be urged practically.

The private sanatoria throughout Germany are handsome massive stone or brick buildings built like the cathedrals in Europe to last forever with landscape gardening about them that any park in the world might envy. They do not, however, begin to compete with the public charity or semi-charity institutions.

To an American the elaborateness and completeness of the charity sanatoria throughout England are astonishing. They are built like the modern European hospital, with all conveniences, and everything in the way of equipment that can be desired or imagined. Some of the older sanatoria in England, like at Bournemouth and Ventnor on the Isle of Wight are just handsome old sanatoria, but the recently built sanatoria in England are models of architecture.

The sanatoria at Northwood, Frimley and Pinewood are splendid examples of this recent style, though the new King's Sanatorium at Midhurst will easily surpass them all. The King's Sanatorium has now been building three years and will be building two years more before ready for the reception of a single patient. It will cost when finished $1,000,000. Despite the amount of money that is being put into the King's, Northwood, Frimley and Pinewood, which are not far from it, have only half their quota of patients. Northwood has accommodation for 120 and has about 68 with Frimley and Pinewood in the same plight. The reason for this is not that they have not sufficient patients to fill these sanatoria, but they have not sufficient maintenance to run them. Looking at them one cannot help comparing the American and the English way of building sanatoria.

Saranac Lake Sanatorium was begun by one patient in a shack, the buildings increasing as patients and money increased. White Haven Sanatorium began with three or four patients in a barn, and has gradually grown till it accommodates 166 and practically always has a waiting list. In the case of the King's a million dollars is standing idle while the sanatorium is being built and during the same period no patients are being treated.

We find it sufficiently difficult in this country to get maintenance for our hospitals, yet we never dream of building new parts until the old parts are overcrowded. It is rare, therefore, in America to find empty wards. Throughout England it is the common finding. There is scarcely a hospital in London (none that I personally know of) with its quota of patients. In Brompton and the City of London Hospital, whole wards are vacant.

In the United States we bring our donors in and show them wards overcrowded to the last degree as an inducement for further donations. In England they use just the opposite argument, namely, an empty ward completely equipped crying out as it were for patients to fill it.

Throughout England they insist on fresh air to even a greater extent than we do in this country, possibly on account of all the vacant space they have. In the charity sanatoria it is common to find the largest wards containing only three and four beds.

In the public sanatoria in Germany the wards are a little more crowded, though even there they allow a little more space than we usually do in the United States.

In the public sanatoria in England they endeavor to make the patient do a certain amount of work, especially light gardening, etc., but from my talks with the residents I was inclined to believe this work was more in name than in actuality.

Except in Brehmer's the theoretical ideas in regard to work are about the same all over Europe, namely, rest while there is elevation of the temperature or of the pulse and graduated exercise afterwards.

In many of the sanatoria elaborate douche rooms are found. This is especially true of the sanatoria in Germany, all of which whether private or public are furnished with douche rooms.

The douche rooms at Falkenstein, at Hohenhonnef and Rompler's fell into disuse years ago, though the douche room at Brehmer's is still in action. The douche room in Brehmer's is a common room in the basement with an extremely strong douche falling from a distance of about 12 feet above the

patient's head. The douche is manipulated from a room absolutely separate and unconnected with the douche room and with the patient's chart before him the physician regulates the strength and duration of the douche.

Despite the fact that the majority of the private sanatoria in Germany have given up douches the recent public sanatoria have installed the most elaborate douche rooms that I have ever seen. The story of these douche rooms is usually similar to that at Belzig.

Belzig is an elaborate half charity sanatorium about 14 miles from Berlin where they charge about five dollars a week. It has three departments, one for males, one for females and one for children. The two former were opened about six years ago; the last about a year ago. Each of the three departments contains its own elaborate marble-tiled douche room, magnificently equipped with every kind of douche known to modern medicine. Everything about the room is beautifully nickel plated and one could only imagine it a room in a very luxurious and well patronized Turkish bath. I asked the resident how much use was made of these rooms and he said though he had been there three years he had never seen them used once. In other words despite the fact that the first two rooms had never been used they had recently built the same sort of a douche room in the new children's department.

True, in Germany they possess the ideal way of supporting public sanatoria, namely through the insurance companies and krankenkasse. These insurance companies take in all the people in the State especially working people. Every working man and every working woman must be insured, not only against death but also against disability from sickness or other cause, the employer paying the insurance. When a person falls ill, therefore, the insurance company stands behind to support him. Moreover, many of these public sanatoria have been built entirely or in part by the insurance companies, and money was not spared in the building or equipment. This is true of the sanatorium at Beelitz.

The sanatorium at Beelitz is so complete that it is doubtful if any sanatorium will ever be built to surpass it. It has 600 beds; 300 for tuberculosis and 300 for general constitutional diseases like chronic rheumatism, nervous disease, etc. The two departments are quite widely separated from one another and the males and females are also separated in each department.

The absolute completeness of everything at Beelitz is shown by their elaborate wash rooms. There is a wash room at both ends of each floor. These rooms are handsomely tiled and contain the most improved modern marble wash-basins with all their appurtenances. In addition there are a dozen of places (as many as there are wash basins) in the middle of the room for washing the teeth. These places are separated one from another by zinc enamelled partitions and contain a self-washing porcelain basin somewhat similar to our dentist's basin with a spigot eighteen inches above. The arrangement is ideal though undoubtedly very expensive. Our dentist's basin costs forty dollars; it is impossible to imagine what all their elaborate system would come to.

Each of the four departments of Beelitz has its own elaborate douche room more elaborate and more beautifully equipped and according to the statement of the resident as rarely used as those at Belzig. In other words because Brehmer advocated douches forty years ago, they are still installing douche rooms even where they do not believe in them.

The details of the equipment of Beelitz that are out of the common would necessitate more time than can be devoted to them in one evening. Not a few of these elaborate details are superfluous, yet there is an excuse for Beelitz which does not exist for the elaborate sanatoria in other countries especially England. In the first place all the public sanatoria in Germany are magnificently maintained so that there is no feeling that more money should have been put into maintenance; secondly, Beelitz itself was built by the People's Insurance Company (the Landesversicherung) which found itself in the position where a certain amount of money had to be gotten rid of or it would probably go elsewhere.

The Berlin branch of the Landesversicherung had a surplus of something over thirteen million marks when the idea arose that sanatoria should be built by the insurance companies. Since practically every city and state was to have its own sanatorium, the Berlin branch feared that unless all this money was used some of it would go to other places, consequently instead of seeing for how little they could build a sanatorium they were obliged to try to get rid of the thirteen million marks or something over three million dollars. They have put into Beelitz Sanatorium this whole sum.

In all the sanatoria of Europe they insist on good nourishment, though the details of the nourishment differ somewhat. In most places they simply supply six meals a day, three substantial ones, and three lighter ones, the latter usually composed of milk and raw eggs.

There is practically no insistence on altitude or climate. The recent sanatoria over the continent are at all degrees of elevation and the very handsomest and most elaborate are not elevated at all, at least not more than will give them a free sweep of the country more on account of the view than any other reason.

Sea-coast, too, appears to make no difference in their minds. The older English sanatoria like Ventnor and Bournemouth are on the sea-coast, the more recent ones in the country near the large cities.

In France where the adult sanatoria are all recent the great majority are on the sea-coast. In Germany they have taken no pains but to put them near the large cities, the handsomest ones that I saw, namely Buch, Belzig, and Beelitz being built on the level without view of any kind (except their own landscape gardening) just outside of Berlin.

I found no special methods of treatment. As in this country, in some sanatoria they use tuberculin freely, in others not at all. Many of the sanatoria show very handsome and splendidly equipped inhalation rooms. On inquiry in the private sanatoria I found that creosote was the most common medicament inhaled. I asked if they thought they derived any benefit from it and they answered that they did not ex-

cept whatever mental impression it had on the patient. In the public sanatoria like Beelitz these inhalation rooms are not used at all.

Everywhere throughout Europe the house sputum cup was of china shaped like a shaving mug with a removable depressed cuspidor top, and the outside cup a Detweiler blue glass pocket cup, open at one end by a spring top and at the other by a screw top. The germicide usually used was lysol; in one or two places they still used carbolic acid and in one, Bournemouth, they were still using bichloride of mercury. Only two claimed to have made a study of the best germicide for sputum, namely, Ventnor and Hohenhonnef: in both these places they were using caustic potash. I mention this with a certain amount of pride since at the Phipps Institute in Philadelphia we have always used caustic potash in the form of lye. I would like to add also that I never before came in close contact with the Detweiler pocket sputum cup and I was not impressed by it. Even with the utmost care the top and bottom loosen in a short time allowing the sputum to continually contaminate the pocket and, therefore, also the hands.

Hospitals for advanced cases serve the purpose of the prevention of tuberculosis by removing the case in its most contagious period and so preventing it acting as a further focus of contagion in the home. The cases ordinarily seen in these hospitals are from among the poor. Such cases may live in a helpless condition six months or a year or even longer. During this period the tubercle bacilli appear more virulent and the wage-earner or housekeeper is not only taken from the family but extra work is thrown on the others in the household by the nursing and care of the invalid. Moreover, among the poor it is not uncommon to find a dying case sleeping in the dining room or the living room in order that unnecessary steps may be saved the attendant.

The usefulness of a hospital for advanced cases is, therefore, evident. Special hospitals for advanced cases are found in all the countries of Europe but the best known are in England. Among those I might mention the Royal Hospital for Diseases of the Chest founded in 1814, Brompton Hospital founded in 1841, the City of London Hospital founded in 1848, North London Hospital, etc.

It is a remarkable fact that London, the largest and one of the most crowded cities in the world, has the lowest death rate from tuberculosis, and it appears to me that this can be accounted for only by the fact that London has had for so many years hospitals for advanced cases.

There is another very important purpose served by the hospital for advanced cases, namely, the better instruction of physicians by means of the autopsies. Brompton Hospital, for instance, has 190 autopsies a year and the others in London a corresponding number. In some ways the physician, especially the conservative physician, is lagging behind the layman in the crusade against tuberculosis. The autopsy table of the hospital for advanced cases is, therefore, an urgent need.

The only special hospital for advanced cases of tuberculosis that I saw in Berlin was the Invalidenheim. This is as yet only an experiment, accommodating a small number of cases, but the need for such hospitals is recognized and they expect to proceed further with them. The general hospitals, however, of Berlin and Paris have special wards for consumptives, thereby deriving the benefit of the special hospital. In this country we have driven the advanced consumptive out of the general hospital and except in one or two cities have given him nothing in return.

The most modern machine in the fight against tuberculosis and one that stands in the foremost ranks on account of its power of controlling the tuberculosis situation, is the tuberculosis dispensary. The dispensary of the past saw and treated its case and thought no more about it till it returned; the modern tuberculosis dispensary follows the case to its home and endeavors to control the situation throughout the household.

As Calmette says: "The physician in the tuberculosis dispensary must act very differently to the physician in an ordinary dispensary. In the ordinary dispensary the physician examines the patient and gives him a prescription; he pays little or no attention to the lodgings, resources, the best mode of assistance or the environment of the patient. Such an attitude was all right fifty years ago when the powers of resistance and the care of the patient were not well understood, when it was not known that further spread of the disease could be accomplished, when the disease was thought a dispensation of Providence and could not be prevented by human means; but with the progress of science, with the knowledge of the cause of diseases and how to prevent them, the duty of the physician has been very distinctly broadened. He must not only cure the disease in the patient but he must prevent its extension further. He must not only treat the patient but he must coöperate actively with public charity, he must teach families how to live, advise mothers on the proper raising of their children, decide on the salubrity of lodgings, etc., so that taking all in all his rôle as educator becomes more important than that of examining physician." In ancient mythology Apollo was regarded as the god of medicine and as the announcer of death, the tuberculosis dispensary of today would make him also the preventer of disease.

There are two names especially notable in the foundation of the tuberculosis dispensary, namely, Phillips of Edinburgh and Calmette of Lille in France. The tuberculosis dispensary at Lille, or as it is called by Calmette the preventorium, was founded in 1901. According to Calmette's own account the preventorium is not merely to diagnose the case and distribute medicine to the poor but to investigate and draw under control cases affected with tuberculosis; to give these cases sufficiently often or over a sufficiently long time whatever care they need; to properly advise them and their family; to give them when they are obliged to stop work proper nourishment, clothes, bedding, spit cups and germicides; to make their lodging hygienic; to insist on frequent cleansing and disinfection; to procure for them when necesary a more hygienic lodging; to gratuitously wash their linen in order to avoid contagion in their family and elsewhere; to see that private

benefaction is properly expended and to obtain succor for the patient in every way.

In the preventorium at Lille when the patient comes in he is sent to a bath room and while he is taking a bath his clothing is disinfected. The patient then comes to the physician for examination. This examination is very complete both as regards the condition of the patient and the details of his ocupation and general environment. If the patient has tuberculosis or the disease is suspected he is given directions how to live in order to recover and in order to prevent infecting other people. He is also given a pocket spit-cup, a house spit-cup and a liter of a 2% solution of lysol with very definite instructions how to use it. A day or two later a nurse is sent to the house to get in touch with the rest of the family, explain to them how the patient ought to live in order to get well, and how they ought to live in order to prevent infection.

If the apartments are not suitable she advises change; if the patient is not in a position to obtain sufficient nourishment she reports it and the dispensary helps him out. The dispensary supplies milk, eggs, meat, coal, and sometimes lodging. In addition it takes care of all the patient's laundry in order to make sure that it is frequently washed and to avoid the possibility of infecting the laundress. It is considered that no matter how careful the patient is it is practically imposible to avoid contamination of his clothes, thus leaving him a menace to himself and others. Printed pamphlets are also given to the patient insisting among other things on moist, not dry, sweeping.

Calmette says: "Such a preventorium should be installed in one of the populous quarters of the town. It is in no way a menace to the neighborhood, in fact it is much less dangerous than the ordinary dispensary or charity organization quarters where diseases of all kinds are seen and where sufficiently vigorous measures are lacking to avoid dissemination of germs of all kinds. Such a preventorium can be created and supported by private benefaction, by beneficial societies, by charitable societies or by cities themselves."

Calmette's statistics on the general cost of such a dispensary is about 30 cents per day per patient. In 1904, 287 families were thus assisted at a cost of $5,400.

Throughout Paris they have opened up three or four dispensaries on the order of the one at Lille. I personally visited only one of these, namely Beaujon Dispensary. This imitates Lille very closely, and probably the only thing worthy of particular mention about it is the fact that its expenses are entirely borne by one enthusiastic young woman of 23 who, though possessing no means herself, collects the money for this dispensary yearly. Practically the only support given in the Beaujon Dispensary at present is in the form of meat, and since ordinary meats are quite expensive in Paris patients are supplied when necessary with 100 g. of horse meat daily. As at Lille, however, the physician follows the patient into the home and insists on proper discipline and proper precautionary measures.

Though practically founded in France the tuberculosis dispensary appears to have had its greatest development in Germany. Berlin has three or four of these preventoriums which prepossess one as most thorough in their work. In Germany they are called Fürsorgestelle.

In my opinion Berlin has the best control of the tuberculosis situation of any city in the world. It has three very handsome and very large sanatoria, four tuberculosis dispensaries, three park convalescent camps and various societies which aid in the prevention of tuberculosis.

Considerable of this magnificent control is due to Prof. Pannewitz. The head of the dispensary system in Berlin is Dr. Puetter who was brought to Berlin from Halle for this purpose on account of his success in Halle. The park convalescent camps are the result of the earnest work of Dr. Becher encouraged and assisted by Prof. Pannewitz.

I was especially prepossessed by the general economy especially of the physician's time in the Berlin Fürsorgestelle. The system was about as follows: There were three connecting rooms; in the first the patient waited his turn, in the second were two or three nurses who took the histories, and in the third the physician made the examination. The nurses took the complete history of the patient not only relative to his occupation and home suroundings but even in relation to his previous diseases, his present symptoms, etc.

In both France and Germany the history sheets are models that might be imitated everywhere. The German one appears to me especially complete.

After the nurse has gotten the complete history the patient again waits his turn and goes into the doctor for examination. The examination was more or less perfunctory and not very detailed. In other words the Fürsorgestelle cater more to the treatment of the patient and the further prevention of the disease than to the study of the individual case. The physician decided only that the patient had tuberculosis, the general stage of advance and the probable prognosis. After the examination the patient was sent home without treatment and a day or two later the nurse visited the house and investigated the home conditions as to destitution, surroundings, etc. If the patient were suitable from the standpoint of destitution the patient and his whole family returned to the dispensary on another day. Each member of the family or of the household was examined and all instructed how to take care care of themselves either to cure or prevent the condition. If the house or apartments in which they lived were unsuitable they were not only encouraged to seek other quarters but it was insisted on. A member of the family was at once sent out to seek these quarters and when found the nurse decided on their suitability. If these quarters were more expensive than the old ones and the patient could not afford to pay the extra price the dispensary paid the difference between the old and new lodgings.

If the patient or patients were extremely early cases and could continue their occupation while recovering they were allowed to do so. If the family income was insufficient to procure proper nourishment, proper nourishment was supplied by the dispensary. If the case was more advanced but still curable it was sent to a sanatorium. If the patient was quite

advanced but could be handled at home the patient was encouraged to go daily to a day camp and particular attention in the way of prevention was paid to the rest of the family. If the patient was very advanced and the surrounding circumstances were unfavorable to his remaining at home he was sent to the Invalidenheim.

The control of the tuberculosis situation in Berlin is complete on account of all the different institutions working in harmony. It thus happened that if a patient could not be controlled in one way he could be controlled in another. Each part of this magnificent system was controlled by its special men yet all parts worked together so as to control the situation.

In these dispensaries the nurses did very good and very intelligent work. I sat for hours in these dispensaries listening to different nurses extracting histories from patients and it seemed to me that they did it quite as well as a physician. I am remarking this side of it on account of the general economy of this method and the large number of cases that the physician is thereby enabled to see.

The nurse visited the home of the patient once a week, or once every two weeks, in order to see that the instructions were being properly carried out. The patient visits the dispensary, if a curable case, about once a month and, if incurable, even less frequently.

Another very good thing which originated in Berlin is the park convalescent camp (Walderholungsstätte). I visited these in company with their founder, Dr. Becher. The principal one is at the edge of the Grünewald or Green Forest, eight miles from the centre of the city. It consists of a rather pretty Queen Anne cottage one story high with a little distance from it a long rough kiosk, the whole surrounded by about an acre of ground enclosed by a wire fence. The cottage contains quite a large kitchen from which can be fed two hundred people at a time. The dining room is furnished with rather rough benches and tables and seats about sixty.

This camp is intended for patients too advanced for sanatorium treatment but capable of caring for themselves at home, and for patients who are forced to stay at home from work on account of temporary indisposition.

The patient comes here early in the morning, between 8 and 10 o'clock, and remains till between 4 and 6 o'clock in the afternoon. The kiosk is furnished with steamer chairs giving the patient an opportunity to sit out all day in company with others. The camp supplies the mid-day meal at the nominal sum of seven cents and gives the patient free of charge a pint of milk at 10 a. m. and at 3 p. m. This scheme works very much better in Germany than in the United States. In the first place the meals and the milk are supplied by the insurance companies, in the second place the railroads give the patients special rates, for instance, the ordinary charge to Grünewald by train is eight cents, railroad working men and patients for the camp pay only two cents. Moreover, the street cars and omnibuses give special rates of seventy-five cents a month for an unlimited number of rides in both directions.

These camps are undoubtedly good for several reasons: (1) They give the patient what he needs, namely, plenty of fresh air, and they encourage him to take it by the companionship of those about him. (2) They give him the nourishment necessary and teach him what nourishment he should take. (3) They keep him away from his own apartments and, therefore, his family for a considerable part of the twenty-four hours. (4) They encourage methods of prevention by insisting on the practice of those methods at the camp.

These park convalescent camps are managed by a nurse and two or three kitchen women. The camp supplies the necessary blankets and the general comforts. With the city contributing the ground near one of its parks such a camp can be installed for about $1500 to $2000 initial expense, and kept up for probably $60 per month, provided the meals are paid for. Any physician in town is entitled to send his patients to these camps. The patient is not treated at the camp and so remains entirely under the control of his home physician. The patients have the privilege of resting all day or walking about through the woods depending on the directions of their physician.

My principal object in visiting Berlin was to study the convalescent camp with the idea of starting one in Philadelphia. I was not as much prepossessed as I expected to be; yet I thought them a very good adjunct in the crusade. Anything tending to educate the patient or remind him of the care he should constantly take cannot help but be serviceable.

From experience I have learned how soon patients forget their teaching, even when it has been instilled by months of routine in a sanatorium. One day a month spent in a convalescent camp would I believe keep the patients on the *qui vive*, consequently the usefulness of the camps is apparent.

The fifth thing in the crusade against tuberculosis is the tuberculosis society composed of physicians and lay people, the principal object of which is the education of the people in the prevention of the disease. The oldest society in the world with this main object is the Pennsylvania Society for the Prevention of Tuberculosis founded in 1892. Though the United States possesses the oldest society of this kind in the world, the Europeans have developed it in a way that might easily make us blush. In New York and Chicago the Anti-Tuberculosis Society is developing along the lines popularized in Europe, but even they are not yet far advanced. In Europe they have combined with the Anti-Tuberculosis Society every other society, no matter what the general object, which might in any way aid the crusade against tuberculosis. Boards of Health, Charity Organization Societies, Children's Aid Societies, Day Nurseries, Labor Unions, Workingmen's Beneficial Associations, Civic Betterment Societies, Tenement House Societies, City Park Societies, Anti-Dust Societies, Temperance or Total Abstinence Societies, are all brought in to aid the cause.

What was learned from the Congress and the investigation of the tuberculosis work in Europe?

(1) That although the sanatoria in the United States are

probably accomplishing better results in individual cases, we have not a sufficient number of sanatoria. Germany with only two-thirds our population, not one-tenth our area and not one-twentieth our wealth has more sanatoria and is spending three times the amount of money on them.

(2) We are not using all the means that might be employed to build and maintain sanatoria, like insurance companies, beneficial societies, etc.

(3) We are lacking in hospitals for advanced cases, and until we get them, wards in general hospitals should be set aside for the care of the tuberculous. Such wards in addition to caring for the consumptive will help in the education of the general physician, the residents, the nurses and the patients.

(4) The tuberculosis dispensary as managed in France or in Germany is the most important element in the crusade against tuberculosis and we are woefully lacking in them. A city the size of Philadelphia should have at least half a dozen, and it has one. Baltimore should have three or four and it has one. Such dispensaries might be supported as follows: One by the city (as in New York City), one by charity, and one by a combination of beneficial societies.

MOSES MAIMONIDES.[1]

(In Memoriam 1205-1905 C. E.)

By David Israel Macht.

Though the subject of this paper is rather out of the ordinary and the atmosphere into which I wish to introduce you an unfamiliar and foreign one, I think it hardly necessary to beg for gracious indulgence and respectful attention from an audience such as is here assembled.

The most superficial student of Semitic literature and history cannot fail to be impressed by the general ignorance prevailing on these subjects, even among the most cultured, and to this the field of medicine is no exception. To the average western student of medicine the history of his noble art begins with the Greeks, and then, with one vast stride, passes directly to the achievements of the modern English, French, and German physician; all the rest is considered of no importance. The work of other peoples, the contributions of other races are usually overlooked, sometimes ignored, and often, what is worst of all, misrepresented. Anyone who makes at all a study of the subject meets now and again with many and many a false inference, and unwarranted conclusion, a misstatement with regard to some work or personality, based on nothing more substantial than a few paltry quotations and those not in the original, but translated, and drawn by those who condemn what they do not understand.

Of Maimonides, the subject of this paper, the following is the note made by Osaibya, a distinguished Arabic physician and historian.

"He, Abu Amram Musa ben Maimuni, was a man deeply versed in the sciences and philosophy, who both in theoretical and practical medicine held the foremost place among the physicians of his time."

Of the same Maimonides, a modern English authority writes: "At his death, the grief at the loss of the 'Light of the Age,' was universal in East as well as in the West, and he has been recognized universally as one of the noblest and grandest men of all times, gifted with the most powerful and brilliant qualities of mind, possessed of the most varied and astounding knowledge." (Chambers' Encyclopædia.)

But recently, the seven hundredth anniversary of Maimonides' death was celebrated by Jews the world over: How many in this assembly have even heard of his name? And yet, the field of medicine is supposed to be the most universal, the most cosmopolitan of all the arts and sciences! This fact is perhaps sufficient apology for the following humble sketch.

Moses Maimonides, or as he is more commonly known among the Jews, from the initial consonants of his name (*Rabbi Moses Ben Maimon*) *Rambam*, the greatest Jewish philosopher of modern times, a pre-eminent religious authority, a proficient mathematician, and, according to Arabic historians, one of the most prominent physicians of his time, was born in the city of Cordova, Spain, on the 14th day of the Hebrew month Nissan (30th of March) 1135 C. E. His father, a pupil of the then famous Joseph ibn Migash, was quite a learned man, and could trace his descent from the House of King David. He early took cognizance of his young son's precocity and brightness of intellect, and endeavored to give him that most precious of wealth, which is the ideal of every Jewish parent, a complete and thorough, all-round education. Maimonides imbibed his early knowledge in the cities of Cordova and Lucena. His father himself taught him the Torah (Bible) and Talmud; from the Arabs, who dominated Spain at that time, he learned mathematics, astronomy, philosophy, the natural sciences, and especially the science and art of medicine.

The peaceful life of the Maimuni family was early disturbed by the Almohades, a wild tribe of Arabs from North Africa who captured Cordova in 1148, and offered to both Christians and Jews the choice of either Islam, or death. The Maimuni family preferred to emigrate.

After quite a long period of wandering life in Christian Spain, they at last made their abode in the city of Fez, in 1159. Here, the worthy Caliph Abdelmummen was not so zealous in his religious persecutions. He contented himself with requiring the outward observance of some Moslem customs only; with the private life and practices of his subjects he did not directly interfere. The Maimuni family remained

[1] Read before the Johns Hopkins Hospital Historical Club, December 11, 1905.

here for some years, the young Maimonides all this time, in spite of their wanderings and tribulations, being deeply engrossed in his studies. It was at this time that he published the first of his great works, the Pirush Ha-mishniyoth, Commentary to the Mishna, the legal portion of Talmud. This work, though primarily a religious one, is of interest to us as containing quite a considerable amount of medical matter especially on anatomy and hygiene.

The precarious life of practicing their religion in secret was not to the taste of the Maimuni family. This and the martyrdom of the revered Rabbi Yehuda Hakohen of Fez prompted them again to grasp the wanderer's staff. They took ship for Acco, Palestine, in 1165 C. E., where after a very stormy and perilous voyage they at length landed. So great was their joy that the date of their landing remained a day of thanksgiving in the family for years to come. Their wanderings, however, were still not over. Lack of sustenance made life even in the Holy Land, an impossibility, and it was only in Egypt in the city of Fostat, or old Cairo, that they at length found a permanent home.

It is in Fostat that Maimonides' greatest work was done and his fame established. His path to glory, however, was not bestrewn with roses. More troubles were at hand. His father died soon after their coming; then two children; and, closely following, his elder brother David, the support of the family and his best friend suffered ship-wreck, lost his whole fortune, and was himself drowned. Rambam's only consolation was in his work and faith. He now rapidly gained renown. As a Jew he became chief Rabbi of Kahira, an eminent position spiritually, though of no value as far as remuneration was concerned. Socially, he made rapid strides in his medical profession, and was soon at the head of his compeers. The poet and kadhi, Alsaid Ibn-Sina Almulk wrote of him:

> **Galen's art heals only the body,**
> **But Abu Amram's (Maimonides') the body and soul;**
> **With his wisdom he could heal the sickness of ignorance.**
> **If the moon would but submit to his art,**
> **He would deliver her of her spots at the time of full moon,**
> **Cure her of the periodic defects,**
> **And at the time of her conjunction save her from waning.**

He gained the favor of the vizier Alfadhel and through him came to the notice of that remarkable romantic figure, standing out so conspicuously in the history of the Middle Ages—The Sultan Saladhin Jussuf ben Ajub, or as he is commonly known, Saladin. Saladin appointed Maimonides his court physican, a position which Rambam retained the rest of his life, under both Saladin and his successor Alfadhel. This assured him his living so that he could devote more time to his studies and works. That his hands were full at this time there can be no doubt. In a letter to one of his pupils, R. Juda Ibn Tibbon—a letter which has become a classic in modern Hebrew literature, and is quoted in almost every Jewish history—he gives us the following glimpse at his life:

"With respect to your wish to come here to me, I cannot but say how greatly your visit would delight me, for I truly long to communicate with you and would anticipate our meeting with even greater joy than you. Yet I must advise you not to expose yourself to the perils of the voyage, for beyond seeing me, and my doing all I could to honor you, you would not derive any advantage from your visit. Do not expect to be able to confer with me on any scientific subject for even one hour either by day or by night; for the following is my daily occupation: I dwell in Mizr (Fostat) and the Sultan resides at Kahiro; those two places are two Sabbath days' journeys (one and a half miles) distant from each other. My duties to the Sultan are very heavy. I am obliged to visit him every day, early in the morning and when he, or any of his children, or any of the inmates of his harem are indisposed, I dare not quit Kahira, but must stay during the greater part of the day in the palace. It also frequently happens that one or two of the officers fall sick and I must attend to their healing. Hence, as a rule, I repair to Kahira very early in the day and even if nothing unusual happens I do not return to Mizr until the afternoon. Then I am almost dying with hunger. I find the antechambers filled with people, both Jews and Gentiles, nobles and common people, judges and bailiffs, friends and foes—a mixed multitude who await the time of my return. I dismount from my animal, wash my hands, go forth to my patients, and entreat them to bear with me while I partake of some light refreshment, the only meal I take in twenty-four hours. Then I go forth to attend to my patients, write prescriptions and directions for their several ailments. Patients go in and out until night-fall, and sometimes even, I solemnly assure you, until two hours and more in the night. I converse with them, and prescribe for them, while lying down from sheer fatigue; and when night falls I am so exhausted that I can scarcely speak. In consequence of this, no Israelite can have any private interview with me, except on Sabbath Day. On that day the whole congregation, or at least, the majority come unto me after the morning service when I instruct them as to their proceedings during the whole week; we stay together a little until noon, when they depart. Some of them return and read with me after the afternoon service until evening prayers. In this manner I spend that day. I have here related to you only a part of what you would see if you were to visit me."

With all this, he found time to write a number of medical works, as we shall see, and published his great religious work, the Mishna Torah, a complete code of Jewish Law, and his greatest philosophical treatise—the Moreh Nebuchim or "Guide of the Perplexed,"—a work which has ever since remained famous and was even then admired by the Christian scholars, Thomas Aquinus and Albertus Magnus. Certainly of him we could not quote the lines from Chaucer:

> **Nowher so bisy a man as he ther was,**
> **And yet he semed bisier than he was.**
> —*Prologue*, ll. 321-2.

It was at this time that Maimonides received an invitation from King Richard, the Lion-Hearted, the soul of the Third Crusade, to become his physician in ordinary; but Rambam declined. Those who have read Scott's charming little novel, "The Talisman," will perhaps recollect that author's descrip-

tion of the Arabic physician Al Hakim, whom Saladin is supposed to have sent to cure Richard. It is more than possible that this character was suggested by Maimonides.

Maimonides lived to the age of sixty-nine. Hard work, sympathy for his brethren, the victims of the inhuman persecutions of the Dark Ages, and personal misfortunes hastened his death, which took place on the 20th day of the Hebrew month Teves (Dec. 13) 1204 C. E. A public mourning was proclaimed by both Jews and Gentiles; and he was buried with honors in the city of Tiberias.

The works of Maimonides fall into three categories: (1) Religious. (2) Philosophical. (3) Medical.

Though it is with his medical works that we are here chiefly concerned we cannot give a fair estimate of Maimonides as a physician without a brief reference to some of his other writings; for after all, a great man's work, whether it be in the domain of speculative philosophy or in the field of inductive science, is bound to reflect his personality. Maimonides' aim in life was first and above all to be true unto himself—to be a perfect, consistent Jew, in the highest and noblest sense of the word. He early recognized the utter futility of the attempt to eradicate indelible differences by forsaking the Torah or Sacred Law, in an effort to promote the universal brotherhood of men, but thought it rather much better to further that purpose, by each one proving true unto himself, and acting his part well. And so he remained loyal to his colors; he staunchly clung to what he regarded as Truth; and he tried to do his best in the world by living up to the Law. He sacredly observed his Sabbath, strictly followed the Jewish dietary laws, scrupulously carried out every religious and moral injunction of his people, and all his vast store of philosophical and scientific information went but to strengthen his faith.

It is, therefore, not surprising to find his great religious work Mishna Torah (or Code of Jewish Law), his most important philosophical treatise the "Moreh Nebuchim" or "Guide for the Perplexed," and many of his other works—replete with much useful information on physics, mathematics, astronomy, anatomy and especially hygiene. In his Hilchoth Deoth, a part of the afore-mentioned Mishnah Torah, Maimonides builds up a system of ethics, and no small part of that work is devoted to the consideration of one's duties to his body—the care of health. Far ahead of the monastic and ascetic tendencies of his age, which saw a special virtue in destroying flesh by burdening the body with chains of iron, he boldly asserts that a healthy soul requires a healthy temple to dwell in, or as he puts it—a perfect body is an essential to the proper serving of God. Together with the injunctions to love our neighbors as ourselves, to curb pride, to love the stranger, widow, and orphan, and to practice humility and charity, he admonishes us to take care of our health, avoid excesses, to regulate our diet and sleep. The Biblical verse, "He that guardeth his mouth and tongue, keepeth his Soul from distress" (Prov. XXI, 23), he interprets literally as well as spiritually: "He that taketh care of what he eateth and drinketh will keep his soul from distress." Indeed in his Ethics, Rambam gives us a pretty complete system of practical hygiene, so modern in tone that it could well compare with the most recent text-books on the subject. He goes minutely into the dietary; discusses the relative values of various foods; the effects of the summer and winter seasons; the care of bowels; the importance of proper sleep and exercise. He dwells on the subjects of clothing and hydrotherapy. *Lack of exercise, over-eating, alcohol,* and *sexual excesses,* he summarizes, are responsible for the cause of most diseases. Any disturbance in the excretory functions of the body will lead to pathological conditions. He concludes with the assurance that any one attending to the simple advice given will be pretty sure of maintaining good health, *unless* his condition has already been undermined (1) by disease; (2) by some herditary taint or defect, or (3) by "Exposure to the scourge of some epidemic."

In Chapter XXIII he mentions the ten requisites for any town to be fit to dwell in: (1) a proficient physician, (2) a proficient surgeon, (3) proper bathing facilities, (4) proper sewerage, (5) a fresh water supply, (6) a place of worship, (7) a proper school, (8) a scribe or notary public, (9) a court of justice, (10) a charity organization.

Of Maimonides' strictly medical works there exists quite a collection, though many of them are either in Arabic or Hebrew, with a few translations in Latin, Spanish, and German.

The following is a pretty exhaustive list (Cf. Bodleian Catalogue). I have arranged them under five headings:

I. *Expositions of and Commentaries on older authorities.*
   1. Pirké Mosheh (Aphorisms.)
   2. Commentary on Hippocrates.
   3. Compend of Galen.
   4. Translation of Avicenna.

II. *Works on Hygiene.*
   1. De Regimine Sanitatis.
   2. Notes on Dietetics for Saladin.
   3. The Ethics of Maimonides (above mentioned).
   4. Consultation on Various Accidents.

III. *Works of Physiological Character.*
   1. On Foods.
   2. On medicaments.
   3. Sefer Hassamim or Toxicology.

IV. *Works on Special Subjects.*
   1. On Hemorrhoids.
   2. On Gout (Podagra).
   3. On sexual relations.
   4. On asthma.
   5. Sefer Refuoth.
   6. On psychology, etc.

V. De Causis et Indiciis Morborum.

The Pirké Mosheh is a book of aphorisms from the older writers Hippocrates, Galen, Al-Razi, the Hebrew physician Ebn Zohar, or as he is more commonly known Avenzoar, and others. It consists of 25 sections or chapters, and was originally written in Arabic and later translated into Hebrew and Latin. The following are the subjects treated of, as far as I could learn from the Hebrew translation.

Chap.	I.	Anatomy of various organs.
"	II.	Of various tissues and fluids.
"	III.	Physiology.
"	IV.	On pulse.
"	V.	On urine.
"	VI.	On various signs.
"	VII.	On various changes in the body.
"	VIII.	On convalescence.
"	IX.	On some special diseases.
"	X.	On fevers.
"	XI.	Duration and limits of disease.
"	XII.	Hemorrhage, etc.
"	XIII.	Purgatives.
"	XIV.	Vomiting.
"	XV.	Burns and other skin affections.
"	XVI.	Women.
"	XVII.	Hygiene in general.
"	XVIII.	Work.
"	XIX.	Bathing.
"	XX.	Foods and drinks.
"	XXI.	Drugs in general.
"	XXII.	Various specifics.
"	XXIII.	Notes on diagnosis.
"	XXIV.	Addenda.
"	XXV.	Notes.

To go more minutely into his treatment of the subjects would take too long.

De Regimine Sanitatis is a "Makrobiotic," or Book on Hygiene written by Maimonides at the instigation of Sultan Alafdal, successor of Saladin. The same was a sickly man and asked Maimonides to write him some rules of life. Maimonides promptly responded with wholesome, though perhaps not very flattering and agreeable advice. Quoting from Hippocrates he boldly tells the profligate monarch that we preserve our health in proportion to our abstinence from over-eating and other excesses. "For the preservation of health and length of days," he goes on further, "above all, moral purity and spiritual activity are necessary; whereas a loose life will bring one quickly to his grave. One must, therefore, strive to attain to perfect self-control. But it is only those that draw their moral strength from philosophy and religion, that can attain to such a state." He then gives the Sultan various medical advice, prescribes a dietary and medicine and concludes with the prayer: "May the health and strength of the Sultan be prolonged as it is the wish of his humble servant Moses ben Maimon."

Of the third group of works, the Sefer Hassamin or Maimonides' Work on Poisons is perhaps the best known. A German translation with notes by Steinschneider is found in Virchow's Archiv, Vol. LVII. Maimonides was led to write the book at the request of the Sultan on account of the unusual number of cases of bites by poisonous animals occurring at that time. The book is of considerable interest on account of the large amount of exceedingly practical and useful information it contains.

The first part treats of the bites of poisonous animals, and the treatment in such cases, both general and specific. The second part speaks of "internal poisonings," prophylaxis and antidotes. The advice, as Hæser says, is throughout very appropriate. Maimonides speaks of the prevention of the spread of the poison from an infected wound by prompt ligation of the member, by suction of the wound with lips previously anointed with oil, etc. He mentions various specifics and discusses antidotes and emetics. He then takes up the poisonings by particular animals, such as scorpions, snakes, mad dogs, etc.; the bites of man; and again by various poisonous plants, such as hyoscyamus, mandragora, cantharides, various mushrooms and toadstools, etc. The book was very popular. Originally written in Arabic, it was translated into Hebrew, and later under the title "De Venenis" by Amergau and Blasius into Latin.

In the Sefer Refuoth, Maimonides discusses affections of the stomach, tumor of the brain, affection of the meninges, etc.

Of his work on gout, I do not know much beyond the fact that it was written in Arabic and translated into Spanish by Abu Amam ben Abdallah of Cordova.

In forming a critical estimate of Maimonides' position in the history of medicine, we must class him with the so-called Arabic school, and yet, there are differences between him and other members of that group, which give him a distinct and eminent place by himself.

In the first place he is a rationalist, and is bitterly opposed to astrology and other occult arts in which the Arabs were so fond of dabbling. "The eyes look forward and not backward," he tells us in one of his letters; and so, he would never prescribe a remedy which he did not either test himself or receive from some good authority. The use of amulets and incantations he considered an abomination, though he conceded their possible effect as placebos, in pacifying the spirits of the simple-minded. A quack he calls a murderer. Imbued with a pure faith and clear intellect he spurns superstitions and accepts naught which has no solid foundation. In one of his epistles to the Jews of Marseilles in regard to astrology, he gives his views on the subject:

"Know, my Lords, that man ought to believe only one of three things—firstly, something which he can clearly grasp through pure reason, as, for instance, the science of arithmetic or geometry or astronomy; secondly, something which he can perceive with one of his five senses, as, for instance, when he sees, or tastes, or hears; and thirdly, something which he learns from the prophets and sages of blessed memory.

"And a man that has common sense, ought to sift and classify, both in thinking and reasoning, those things which he regards as true and those which he does not, and he should say unto himself, I believe this to be true because I perceive it through my senses, or I believe this to be true through pure reason; or I believe this to be true because I have been told so by the prophets and sages, but he who believes a thing which does not fall under any of these three classes of him it is said: 'The simple believeth everything.' (Prov. XIV.)

"You should also bear in mind that there are fools who have

composed thousands of books, and that many 'great men'—great in years, but not in wisdom—have spent their days in the study of them, and these conceited stupids imagine that these books contain great wisdom; and so their hearts become elated, and they think that they are great wise men because they know that wisdom, and it is just in this wherein most, if not all, the world is in error, with the exception of the few."

In the second place, Maimonides, unlike his contemporaries who revelled in vague and mysterious concoctions of multitudinous drugs was, far ahead of his time, a great opponent of poly-pharmacy, and a warm advocate of the Nature-cure. On this subject he gives us some definite views:

"Now most physicians are greatly in error," says he, "in that they think that medicine strengthens the health; it weakens and perverts it; and for this reason hath Aristotle said that most of the patients who die, do so through the medicine of the physicians. When the interference of the physician is indicated, his task should be (merely) to sustain the strength of the patient and to promote Nature in its effort at repair. Most physicians, however, act wrongly and while they think they help Nature, they hinder it, and destroy its beneficent activity." On reading this passage, we cannot help recalling Dr. Treves' latest utterances on the nature of disease.

In the third place, Maimonides, far in advance of his age, seems to have taken the modern standpoint of looking at disease from the *etiological* or *causal* point of view. It is a great pity that his most important work, the "Sefer Hassiboth" or "De Causis et Indiciis Morborum" has never yet been published, but is in manuscript form in Oxford and Paris; for, as Dr. Alfred Nossig remarks (Die Socialhygiene der Juden, 1899):

"The very manner in which he undertakes his task in this his greatest work, the very fact that seven hundred years before the medicine of to-day, he already looks upon diseases from the etiological point of view, his search for the *causes* of sickness—point to the man's keen intellect, and explain, why he was regarded as such a great physician and rose to such fame."

But, as a historian (Grætz) remarks, "It was not only his wide and deep knowledge and his fame as a physician, but his character which constituted Maimonides' distinction. He was a perfect sage, in the most beautiful and venerable sense of the word." Well-digested knowledge, calm deliberation, mature conviction, and mighty performance, were harmoniously blended in him. He was possessed of the deepest and most refined sense of religion, of the most conscientious morality, of philosophical wisdom and of the keenest scientific insight; or rather, these various elements, which are generally hostile to each other, had in him come to a complete reconciliation. That which he recognized as truth was to him inviolable law; from it he never lapsed for a moment, but sought to realize it by his actions throughout his whole life, unconcerned as to the disadvantages that might accrue. "From the point of view of learning, he occupied the first place of his time, in religion and morality he was rivaled by but few of his compeers, but in his strongly marked individuality he surpassed all his contemporaries. His actions corresponded to his mind. Maimonides was imbued with a most profound earnestness which considered life not as an opportunity for pleasure or gain, but as a serious mission to labor nobly and to confirm by deeds the great truth, that man is an image of God.

"The mean, the false, and the impure were abhorred by him, and were not permitted to approach him."

Maimonides gave the world the Jewish ideal of a physician! And we may all profit by his example.

Perhaps I may appropriately conclude this sketch with a translation of an invocation which he is said to have repeated daily before turning to his day's work:

And now, I tu-n unto my calling;
Oh, stand by me, my God, in this truly important task!
Grant me success! For—
Without Thy loving counsel and support,
Man can avail but naught.
Inspire me with true love for this my art
And for Thy cre-a-tures,
Oh, grant—
That neither greed for gain, nor thirst for fame, nor vain ambition,
May interfere with my activity.
For these, I know, are enemies of Truth and Love of men,
And might beguile one in profession,
From furthering the welfare of Thy creatures.
Oh, strengthen me!
Grant energy unto both body and the soul,
That I may e'er unhindered ready be
To mitigate the woes,
Sustain and help,
The rich and poor, the good and bad, the enemy and friend,
Oh, let me e'er behold in the afflicted and the suffering,
Only the human being!

Balto. Kislev 8 (Dec. 6) 5666.

תם ונשלם שבח לאל בורא עולם:

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OBSERVATIONS UPON PAROXYSMAL TACHYCARDIA.

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In 1903 August Hofmann (1) called attention to the fact that during an attack of paroxysmal tachycardia the pulse rate was exactly or nearly double that present between attacks. This observation has been confirmed in the articles of D. Gerhardt (2), Lommel (3), Rihl (4), Hofmann's second article (5), and more recently Hewlett (6); and as no exceptions have been reported, it is probable that tachycardia, due to sudden doubling of the pulse rate, may be considered a disease entity as definite as Stokes Adam's disease.

The following theories have been advanced to explain this sudden doubling of the heart rate: 1. The theory originally advanced by August Hofmann (1) that owing to some increase in irritability of the heart or to the sudden occurrence of extra stimuli, each regular systole was followed by an extrasystole which occurred exactly in the middle of the interval between the two regular systoles. This view was adhered to by Gerhardt and Lommel, and tracings were given by them showing the occurrence of occasional small systoles midway between regular systoles during the periods between attacks. It was assumed that these were extrasystoles, probably ventricular in origin—the interpolated ventricular extrasystoles of Hering (7) and Rihl (8); but no venous tracings have furnished any evidence in support of this view.

2. James Mackenzie (9) assumes that the tachycardia is due to a prolonged series of ventricular extrasystoles, replacing the regular rhythm. He states that short series of such extrasystoles are not uncommon and calls attention to the fact that the venous tracing in his cases always shows the ventricular type of venous pulse during the attack. This is further borne out by the tracing obtained by Hofmann during an attack, and also by the tracing in the case to be reported below.

Against this view are the facts that in the tachycardia the rate is always doubled; that in most of these cases there are during the attack other signs of tricuspid insufficiency (dyspnœa, enlargement of liver during the attack, œdema of angles, etc.), which would in itself account for the occurrence of a ventricular type of venous pulse. Further, the absence of proof that such short series of ventricular extrasystoles do occur in these cases. Lastly, the tracings of Rihl, and Hofman, and in our own case to be reported below, indicating that in some cases at least the tachycardia has its origin above the ventricle, in either the auricle or the sinus.

3. August Hofmann, in his second paper (5), called attention not only to a sudden doubling of the pulse rate, *e. g.*, from 60 to 120 per minute, but sometimes to a further doubling, *e. g.* from 120 to 240, both changes occurring suddenly without a transitional increase in rate. Subsidence of the tachycardia also occurred by halving of the pulse rate equally sudden. These sudden changes and the 2 : 1 ratio of the pulse rates caused him to suggest that the heart responded to all the impulses arising at the sinus only during the periods of tachycardia; that between attacks, owing to a diminution in conductivity, which he referred to the sino-auricular region, auricles and ventricles responded to only alternate or sometimes only every fourth impulse from the sinus. The latter condition he thought might be due to depression of conductivity in two places, as suggested by v. Kries (10) to explain such successive responses to gradually diminishing conductivity.

4. J. Rhil (4) has given an excellent venous tracing taken during an attack of paroxysmal tachycardia in which each ventricular contraction was preceded by an auricular contraction, and in which, between attacks, the venous pulse showed that the auricle continued to beat at twice the rate of the ventricle (namely, at about the same rate as during the attack); in other words, that there was a partial heart block at the auriculo-ventricular bundle of His. Hofmann (5) also cites one of his cases as showing a similar condition between attacks.

These two cases are somewhat against the third view (Hofmann's) as to the site of the block, indicating that in them, at least, it is at the auriculo-ventricular junction rather than above it.

However, as yet the number of cases in which venous tracings have been given, and hence in which we have any information regarding the contractions of the auricles, is too small to allow of generalities; and it is largely with a view to adding further material for comparison that our own case is reported. For the privilege of doing so, I wish to express

my thanks to Prof. L. F. Barker, in whose wards the case occurred.

Patient G. D. R., General No. 53,892, Medical No. 19,360, aged 72, American, proprietor of a hotel in North Carolina. Admitted February 22, 1906, complaining of palpitation of the heart. Family history and past history negative, has always been healthy and has had no infectious diseases whatever, and no other cardiac manifestations.

The first attack of palpitation came on suddenly after retiring one evening twenty years ago, causing him great fear but no pain. It lasted six hours and left him weak but otherwise well. Attacks similar in character recurred once every month or so until the last winter (1905-06) since when they have occurred once or twice a week, and have been somewhat more severe than before, sometimes lasting ten hours. During the attacks he passes large amounts of urine. He never notices palpitation between attacks.

P. E. Patient is a large, well nourished man. He does not look especially ill. Color good. Pupils equal and react to light and during accommodation. Thorax barrel-shaped. Angulus Ludovici prominent. Left upper front more prominent than right. Costal angle over 100°. Expansion slight. Chest moves as a whole. Percussion note hyperresonant in front, normal behind. Breath sounds distant but clear.

Heart impulse not seen nor felt. Heart sounds best heard in fifth left interspace 11 cm. from midsternal line. Dulness extends 4 cm. beyond this point to nipple line. Relative cardiac dulness begins above the third rib, and cannot be made out to the right of the sternum. Heart sounds at apex distant but apparently clear; second sound louder than first. At base sounds are very distant, no murmur, even when patient sits up. Pulse 64 per minute, regular in force and rhythm; good volume and tension. Vessel wall sclerotic. Blood pressure between attacks. Maximum, 165-190; minimum, 100-115.

Abdomen large and flabby, considerable panniculus. Relative hepatic dulness begins at fifth interspace, absolute hepatic dulness at sixth interspace and reaches to costal margin. Liver and spleen not felt. *Genitalia* appear normal. *Extremities*—shins smooth; knee kicks present; no ankle or patellar clonus. Small venules distended in inner side of left thigh. Large, mottled, brownish areas on inner side of each knee. Plantar response normal.

History while in hospital.—On February 23 and March 1, patient had attacks of tachycardia, the pulse rate suddenly rising from 80-88 to 160 per minute, respiration remaining 20 per minute throughout; no enlargement of liver, no œdema. During the attacks he has a feeling of terror and weakness, but on the whole he thinks himself better than before admission.

On March 15, patient had two attacks, the first beginning suddenly at 7 a. m., just after returning to bed from going to the closet, where he passed a soft, fluid stool without effort. Tracings were made from over the jugular vein and carotid and brachial arteries during this attack (Figs. 1-3), which lasted until 10 a. m., when patient yawned and the attack suddenly subsided, the pulse rate falling from 152 to 80 or 88 per minute. Venous tracings made during the attacks showed venous pulse of the ventricular type, with no presystolic auricular notch (Figs. 2-3). The blood pressure during attack was maximum 130, minimum 95-100. Tracings made immediately afterward (Figs. 4-5) showed a definite venous pulse of the auricular type identical in rate and form with the tracings obtained at other times between attacks (Fig. 7). There is no sign whatever of a wave midway between the two auricular waves *a-a* such as might correspond with the persistence of rapid rhythm in the auricles after slowing of the ventricles as found by Hofmann (5) and Rihl (*l. c.*). On the contrary, although such an auricular contraction would occur before the tricuspid valves have opened (*i. e.*, before the wave *v*), hence would give a larger wave on the venous pulse than does the normal auricular contraction (*c. f.* Rihl) (11), the absence of any such wave enables one to be quite certain that no abnormal auricular contraction has taken place. The auricular rate had fallen to half the rate as well as that of the ventricles. This is exactly opposite to what occurred in the cases of Hofmann and Rihl.

At noon patient was shown at the medical clinic, which caused him much annoyance, and he was brought back to the ward about 1 p. m. About 3.10 p. m. a second attack of palpitation began suddenly and lasted till 7.30 p. m., pulse rate (140 to 160) and pulse form being exactly as in the first attack. Pressure on the vagus in front of the sterno cleido mastoid, digitalin 1.5 mg. hypo., spiritus ætheris nitrosi by mouth, pressure on abdomen, and deep breathing were all without effect, as had been the application of an ice-bag to the heart on previous occasions. Yawning which had stopped the first attack was tried (voluntarily), but although one beat was dropped in the arterial pulse on one attempt, and on another a small beat produced between two large ones (Figs. 9-10), no change was otherwise manifest in either the rhythm or the force of the ventricles; and the attack was not (Figs. 9-10) aborted. It ceased spontaneously with sudden halving of the rate at 7.30 p. m., and no irregular beats occurred after cessation of the attack.

On March 21, the patient's pulse was somewhat irregular, as shown on tracings (Figs. 11, 12, 13). Unfortunately the Jacquet chronograph was at this time not available and measurements had to be made in millimeters of the smoked paper, the average pulse rate being 76 per minute. However, the drum, as shown during several months of use, when controlled by the chronograph, moved with great regularity, and these measurements therefore represent time relations almost as accurately as though the chronograph had been used.

It will be noticed on these tracings that many of the pulse intervals cover but 7-8 mm., while next to them are intervals of 12-15 mm., almost exactly double; which would correspond with the theory of Hofmann, that the heart in the long intervals was omitting a response to one stimulus. Here again, however, there is no sign of a wave midway between the auriclar waves *a, a;* and for the reasons given above it may be assumed that the auricular contraction also is omitted.

These interspersed long and short beats with a time relation of 2:1 are not the only beats present, numerous others covering 10-12 mm. being also seen, and the relation of these latter to the irregular beats is 7 + 15 = 2 × 11 (systole + extrasystole = twice regular pulse interval), indicating that these represent the regular rhythm and the others auricular extrasystoles. On the other hand, this "regular" interval is sufficiently close to the prolonged period to represent extrasystoles arising at the sino-auricular junction (*cf.* Engelmann (12)).

This form of irregularity, with the appearance of some beats at half the usual interval, seems to be a very common one in cases of paroxysmal tachycardia, as it frequently occurs also in the cases of Hofmann, Gerhardt, Lommel, and Hewlett (*l. c.*). Unfortunately these authors (except Hofmann) give no venous tracings which alone would show the contractions of the auricles, and furnish a clew to the mechanism of the irregularity. Hewlett's radial tracings also show an occasional 3 : 1 interval; but as this also appears on the brachial tracings from our case, when the venous tracings (Figs. 12-13) show that one ventricular contraction had occurred but had not been forcible enough to force open the aortic valves, it is not unlikely that in his case the apparent 3:1 interval is made up of one 2:1 + one 1:1 interval.

The prevalence of the 2 : 1 relation in all the conditions between attacks, as well as in the ratio between the normal pulse rate and that during the attack, is further evidence in favor of Hofmann's theory that the periods between attacks are due to dropping of alternate impulses. Our own case, in which the auricles did not continue to beat at the tachycardia rate after the ventricular rate had become slow, and in which even during the period of interspersed long and short beats, the auricle still kept the same rhythm as the ventricle gives evidence that such a block could not be at the auriculo-ventricular bundle as in the cases of Hofmann and Rihl, but would have to be at the sino-auricular junction. This is more in accordance with Hofmann's own theory than was his own case, which was really against it.

But in our own case the question of the origin of the beats occurring at intervals of 10-12 mm., *i. e.*, entirely out of the 2 : 1 relation remains to be explained, and it is quite possible that this stage of irregularity bears no relation at all to the tachycardia, although at best it indicates a somewhat increased irritability of the auricle; and favors the view that the auricle would take part in originating or transmitting a series of rapid beats.

As to the experimental evidence bearing upon Hofmann's theory, there are some facts of considerable interest: Bayliss and Starling (13) and later Rihl (*l. c.*) showed that if induction shocks were thrown into the auricle too rapidly for it to follow, it responded only to alternate beats. As shown by MacWilliam (14) this depends upon the intensity as well as upon the frequency of the stimulus, and in experiments which I have performed I have been able to confirm this observation for rhythmic stimuli as well as for single stimuli. If the auricle is responding to only alternate induction shocks at a rapid rate, an increase in the intensity of the shocks without change in rate may cause it to respond to all of them. The ventricle may or may not respond to all the contractions of the auricle, the number of dropped beats depending largely upon the degree of asphyxia, as shown by Hering and Rihl (*l. c.*). I have been able to obtain exactly the same results when the electrodes (fish hooks with all but tips insulated) are applied to the sinus instead of the auricles. If, moreover, the irritability of the auricle be increased as by pouring on hot physiological salt solution, while it is responding only to alternate stimuli, it may suddenly double its rate and respond to every stimulus; or may reach this doubled rate gradually after a series of beats in which some are responses to successive and some to alternate stimuli (Figs. 14-15). When the hot salt solution is discontinued the half rate is resumed either suddenly or gradually after a similar transition.

This represents exactly the condition suggested by Hofmann as underlying the attack of paroxysmal tachycardia, although the block is here a purely functional one. Similar functional blocks have been shown by Bayliss and Starling and also by Rihl to be brought on or removed by nerve influence. For example, if rapid rhythmic shocks are thrown into the auricle, stimulation of the vagus may cause the ventricle to respond to only alternate auricular impulses instead of to all. Similarly when some of the ventricular beats are dropped, stimulation of the accelerators causes the ventricles to respond to all by improving the conductivity. Reid Hunt (15) has shown that a similar dropping of alternate ventricular beats in a large number of mammals occurs during vagus stimulation or during periods of increased vagus tone. In these animals, the period of vagus inhibition corresponds to the periods between attacks in the patient with paroxsymal tachycardia (at least in the patients of Hofmann and Rihl), while the normal animal corresponds to the patient during the attack. Another fact common to them is that the systolic pressure during the periods of vagus tone, as between the attacks, is higher than during the periods of rapid pulse rate.

It is quite probable that just as the vagus may produce a partial block from auricle to ventricle, it may also diminish the conductivity from sinus to auricle, as shown in the frog by Engelmann (*l. c.*) and Gaskell (16), and in the dog by Knoll (17), although no such 2 : 1 ratio has been produced here experimentally. Nevertheless this is only a question of degree.

Reid Hunt (*l. c*) was able to demonstrate that accelerator stimulation could also produce temporary slowing of the ventricles due to the rapid rate of the auricles which the ventricles could not follow at first. This was followed by sudden doubling of the pulse rate due to the improved conductivity, the ventricle then responding to all the auricular contractions.

Naturally, it was of interest to determine in our case whether the doubling of the rate was due to loss of vagus tone, or whether some other influence was necessary. The

Fig 1

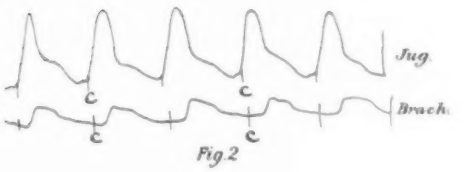

Fig. 2

Fig. 3

Fig. 4

Fig. 5

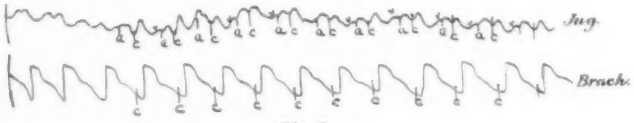

Fig. 6

Fig. 7

Fig. 8

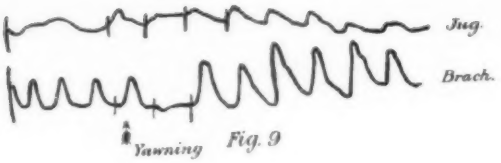

Fig. 9

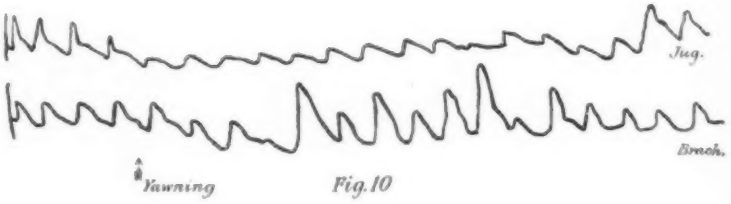

Fig. 10

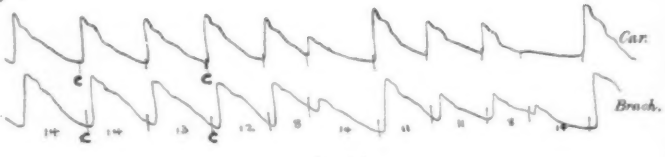

Fig. 11

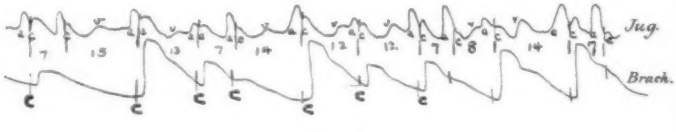

Fig. 12

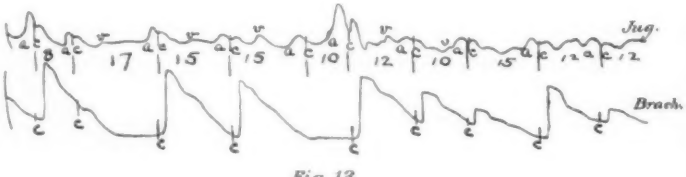

Fig. 13

Fig. 14

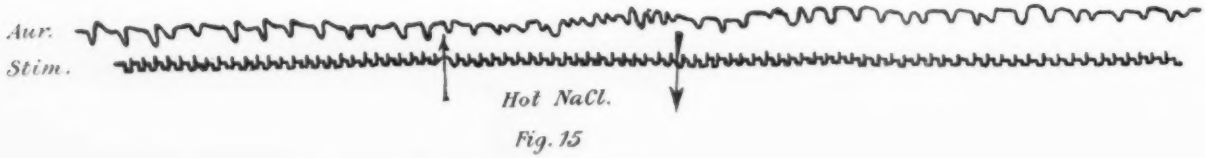

Fig. 15

latter is evidently true; for on March 22 and March 23 the patient was given 2 mg. atropin within two hours, and although his mouth was dry and his pupils slightly dilated, and he felt quite weak and giddy, none the less the pulse rate remained at 76 per minute, unchanged by the atropin. On March 23, while under the influence of the atropin, he was made to walk about the ward, which caused him a considerable effort. Nevertheless there was only a momentary and gradual rise of pulse rate to 96, from which it fell to 76 before a record could be made. He was then made to perform vigorous arm exercises while in bed with a similar result. Fig. 7 shows the venous pulse taken immediately after the exercise, the rate having already fallen back to 76. None of the tracings made at this time show any abnormal auricular contractions.

On March 24, patient was made to inhale two pearls of amyl nitrite, and although his systolic pressure fell from 200 mm. to 170 mm., his face flushed and he complained of heat and throbbing, nevertheless the pulse rate remained at 76.

Both the atropin and the amyl nitrite must have removed the vagus from the field of action, and yet no change of pulse rate occurred. Evidently in this patient the normal vagus tone was very slight, which is not surprising in a man 72 years of age. But it is equally evident that the doubling of the heart rate is not due to loss of vagus tone.

Gerhardt (*l. c.*) has also shown that giving atropin to such a patient does not bring on an attack, although in his case there was a certain degree of vagus tone present, and the pulse rate quickened after atropin. Unfortunately, we have no means of determining clinically whether there is an increased action of the accelerators, nor have we any means of paralyzing the accelerators as we can the vagus. The rate of the accelerators in these cases must therefore remain a matter of conjecture, although the view put forward by Franze (18) that all heart neuroses, and among them paroxysmal tachycardia, are due to disturbed function of the sympathetic nerves, is rather alluring. For the present, this question must remain open.

On the other hand, practically all the means that have been used succcessfully to suppress the attacks—ice-bag to the heart, deep inspiration, pressure on the abdomen, galvanism to the vagus nerve in the neck, digitalin, pressure upon the vagus—depend for their efficacy upon the direct or reflex stimulation of the vagus. As might be expected from the uncertainty of their stimulating power, the results of these methods have been uncertain and variable. The one drug which exerts the purest and most certain action in stimulating the vagus, namely aconite, so far as I have been able to learn, has not been used.

Our patient had no further attacks from March 15 to his departure from the hospital on March 25, and as no other cases of paroxysmal tachycardia have been available, the use of this drug in small doses (five minims of the 1900 pharmacopœial tincture repeated once or twice at half hour intervals), can therefore only be suggested for the present.

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DESCRIPTION OF FIGURES.

Car. = Carotid pulse tracing.
Jug. = Pulsation over the right external jugular vein.
Brach. = Pulse tracing from cuff of Erlanger blood-pressure, apparatus, applied to upper arm at diastolic pressure.
c = Beginning of upstroke upon carotid pulse.
a = Beginning of auricular presystolic wave.
v = Crest of mid-diastolic wave (corresponding to opening of tricuspid valve), *i. e.*, the *vs* wave of Hering and Rihl (*l. c.*).
d = Dicrotic notch upon carotid tracing.
Lettering of figures is uniform throughout.

FIG. 1.—Carotid and brachial pulses taken simultaneously at 8.00 a. m., March 15, during attack. Pulse rate 140 per minute. Drum revolving at highest speed.

FIG. 2.—Jugular and brachial pulses taken simultaneously at 8.15 a. m., March 15, during the attack. Pulse rate 152. Drum at highest speed. Tracing shows jugular pulse exactly synchronous with carotid.

FIG. 3.—Same as Fig. 2, drum at slower speed. Tracing taken at 9.55 a. m., just before end of attack.

FIG. 4.—Carotid and brachial pulses at 10.00 a. m., Pulse rate 88.

FIG. 5.—Jugular and brachial pulses at 10.05 a. m., showing presystolic wave *a-c* not present in Fig. 3. Pulse rate 88.

FIG. 6.—Same at 10.20 a. m., showing the presystolic wave *a-c*, and the diastolic wave *v*. It is to be noted that there is no wave midway between *a* and *a*.

FIG. 7.—Jugular and brachial tracings made on March 23, at 3.00 p. m. Patient had received within two hours two doses of 1 mg. atropin hypo, and had just walked around the ward. The venous pulse is in every way identical with that obtained at other times between attacks.

FIG. 8.—Carotid and brachial pulses taken at same time as Fig. 7.

FIGS. 9 and 10.—Jugular and brachial tracings taken during the afternoon attack (March 15), showing the effect of voluntary yawning.

FIG. 11.—Carotid and brachial tracings, March 21. Figures indicate pulse interval (in millimeters on the curve .15 mm. one sec. (approx.).

FIGS. 12 and 13.—Jugular and brachial tracings taken just after Fig. 11. Figures indicate the pulse interval (in millimeters).

FIG. 14.—Tracings from the auricle (Aur.) of a dog. Rhythmic induction shocks applied to the sinus venosus as shown by the electro-magnetic signal below (Stim.). Auricle responding to alternate stimuli. Between the arrow heads ↑ and ↓ hot 0.6 per cent. Na Cl is being poured over the auricle.

FIG. 15.—Same as Fig. 14, from another dog. Showing some beats responding to every stimulus, some only to alternate stimuli.

A SIMPLE METHOD FOR THE QUANTITATIVE DETERMINATION OF PROTEIDS IN MILK.

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(From the Clinical Laboratory of the Johns Hopkins Hospital.)

The increasing interest in the study of metabolism in infants, whether fed artificially or at the breast, has emphasized the need of some means of determining the proteids of milk, which is at the same time applicable by those with a minimal laboratory equipment and technical experience, and yet sufficiently accurate to be a basis for rational deductions.

The gravimetric and Kjeldahl nitrogen methods are out of the question for the busy practitioner, as they demand time and special laboratory facilities. A method was published by Woodward (Philadelphia M. J., 1898, Vol. 1) some time since based on the separation of fat by heat in the thermostat, the subsequent precipitation of the proteids with Esbach's solution and then centrifugalization in graduated tubes. This procedure requires a rather elaborate equipment and very constant conditions as to speed of centrifugalization, length of armature, etc., to secure uniform results, in addition to the fact that picric acid is not an ideal precipitant for milk proteids.

The method in common use is to estimate the total solids from the specific gravity, to determine the fat, and so arrive at the proteids by difference. The sugar is considered a constant factor, as are the salts.

Among other objections may be mentioned that the small lactometers or aerometers used are often very inaccurate. This is especially true in the analysis of human milk since the available material is small in amount.

The idea that Esbach's tube or some similar device might be adapted to this purpose was suggested to me by Dr. Slemons, and a series of experiments was undertaken to determine if this were practicable.

In the attempt to solve the difficulty a number of precipitants were tried and discarded for various reasons. Among others Esbach's solution, which gave a very coarsely flocculent precipitate. This did not settle evenly, often floated, and so rendered the readings valueless.

With mercuric nitrate the precipitate was finer but also tended to float after standing 10 to 14 hours, apparently from the development of tiny gas bubbles throughout the precipitate, which caused the whole to rise *en bloc* to the top of the tube.

Tannic acid gave an excellent, finely divided precipitate, but this contracted laterally as well as vertically, and regularly toppled over so as to render measurements inaccurate.

Finally an apparently ideal precipitant was found in phosphotungstic acid in hydrochloric acid solution. This substance precipitates instantly all the proteids in a finely divided condition. The precipitate contracts evenly in a vertical direction and reaches a constant minimum volume within twenty-four hours. The supernatant fluid is perfectly clear and gives no trace of proteid by any tests. The solution finally settled upon as the optimum is composed as follows:

Phosphotungstic acid, 25 grams; distilled water, 125 cc.

After thorough solution is obtained there is added:

Hydrochloric acid (conc.), 25 cc., diluted with distilled water, 100 cc.

This yields 250 cc. of a 10 per cent solution of phosphotungstic acid in about 3 per cent HCl. The solution is quite stable if kept in a dark bottle, and gives satisfactory results after months of standing. It is desirable that the components be mixed as indicated, *i. e.*, the well diluted HCl added after solution of the phosphotungstic acid, in order to avoid precipitation.

Having found a satisfactory precipitant, a series of observations was made with human and cow's milk and with various artificial compounds of the latter used in infant feeding, in order to determine under what conditions of dilution, temperature, etc.; direct reading in percentage could be obtained. These readings were carefully controlled in every instance by Kjeldahl nitrogen determinations made in duplicate from the same specimens at the same time.

The milk samples were diluted with distilled water, using normal pipettes and flasks to secure the maximum accuracy. The Esbach's tubes of the standard patterns, reading from 1 to 7 grams per litre, were used. Those reading from 1 to 12 were found to be less uniform in calibration and gave unsatisfactory results.

The diluted milk is poured into the tube to the mark U, being careful to read from the bottom of the meniscus. The phosphotungstic acid solution is added to the mark R, the tube corked and slowly inverted 12 times to secure thorough mixing. Care being had to avoid shaking roughly and thus mixing air in the fluid. The tube is then placed in a rack for 24 hours and the percentage read off at the level of the top of the precipitate. Fractions of percent between the graduations are readily judged by the eye. At dilutions of one part in ten, percentage of proteid is read directly from the scale, while if the dilution be one in twenty we multiply the reading by two, if one in five we divide by two.

The optimum dilution for human milk is 1 in 10. That for cow's milk 1 in 20. If the proteid content be found extremely low we may use 1 in 5 for human milk and 1 in 10 for cow's milk.

As temperature has a definite influence on the volume of the precipitate it is desirable that the tubes be not exposed to extremes, although the differences noted in this precipitate were not nearly so great as when Esbach's solution was used.

No considerable variation was found in volume of precipitates, with temperatures ranging between 15°-25° C. (59°-77° F.), while in thermostat at 37° C. all floated, and in the ice-box at 5° C. (41° F.) all read appreciably higher than at room temperatures averaging 20° C. (68° F.).

The minimum volume of the precipitate is reached in twenty-four hours. Readings at thirty and forty-eight hours showed no appreciable variations.

The presence or absence of cream in the milk also seemed unimportant as far as the volume of the precipitate is concerned. Repeated observations on the same specimens of milk before and after separation of the cream yielded results which tallied precisely.

This observation on the natural milk was confirmed by results obtained from the analysis of artificial mixtures where the percentages of fat were very high in proportion to the proteids.

In a series of over 300 precipitations of various milks the results were surprisingly uniform, particularly in human milk when the mean difference from the Kjeldahl percentage was 0.2 per cent with an extreme of 0.5 per cent. With cow's milk, owing to a slightly coarser precipitate the variations were a trifle wider, mean 0.3 per cent, extreme, 0.7 per cent.

In order to secure accurate dilution of the small quantities of human milk available it is necessary to use accurate pipettes and flasks. A convenient outfit consists of a 2 cc. pipette graduated in one-tenths and a small standard flask of 20 cc. These may be obtained from the chemical supply houses at a cost of about fifty cents. With this apparatus in addition to the Esbach's tubes possessed by every practitioner, a satisfactory determination of the proteids may be made with 2 cc. of milk, giving a dilution of 1 in 10. As in any quantitative analysis it is essential that care be exercised in carrying out the details of the method if accurate results are to be obtained, particularly as the process is purely empirical. But five minutes work will suffice to give a good determination to be read off twenty-four hours later.

THE JOHNS HOPKINS UNIVERSITY.

MEDICAL DEPARTMENT.

THE HERTER LECTURES.

The third course of lectures on the Herter Foundation will be delivered by

SIR ALMROTH E. WRIGHT, M. D.,

late Professor of Pathology, Army Medical School, Netley, Pathologist to St. Mary's Hospital, London, on Monday, Tuesday and Wednesday, October 8, 9 and 10, 1906, at 4:30 p. m. in the auditorium of the Physiological Building, Johns Hopkins Medical School, Washington and Monument Streets.

The lectures will relate to the investigations of Sir A. E. Wright upon opsonins and bacterial vaccines.

You are cordially invited to attend these lectures.

IRA REMSEN, *President.*

NOTES ON NEW BOOKS.

Case Teaching in Medicine. A Series of Graduated Exercises in the Differential Diagnosis, Prognosis, and Treatment of Actual Cases of Disease. By RICHARD C. CABOT, A. B., M. D. 8vo. Cloth. Pp. x-214. *(Boston: D. C. Heath & Co., 1906.)*

The book, as indicated in the title, is a collection of case histories with questions and answers covering various points of diagnosis, prognosis, treatment, etc.

"To aid the teacher in training his pupils to think clearly, cogently, and sensibly about the data gathered by physical examination," is the object of the book, as stated in the preface.

The value of such a work has always seemed rather problematical, especially where actual cases are available for study. There is a strong tendency in such exercises toward too dogmatic and diagrammatic delineation of cases with not a little encouragement to a snap diagnosis. In not a few instances in the book under consideration the details of the case supplied seem very inadequate and hardly warrant the certainty of the diagnosis given.

To those, however, who employ this method of teaching, the book will prove interesting and furnish a number of good cases for discussion.

The Examination of the Function of the Intestines by Means of the Test-Diet. By PROF. DR. ADOLF SCHMIDT. Authorized Translation from the latest German Edition, by CHARLES D. AARON, M. D. With a frontispiece plate in colors. Crown octavo, 91 pages. *(Philadelphia: F. A. Davis Company, Publishers, 1906.)*

This little book is a presentation of the results of the researches of Adoph Schmidt and his pupils into changes of intestinal function as evidenced by the fæces. He properly emphasizes the necessity of a fixed uniform diet for comparable results.

Full details are given for the application of the method, and many useful diagnostic and natural therapeutic points are brought out.

The translation is comprehensive, though it lacks somewhat in smoothness.

International Clinics. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles on Treatment, Medicine, Surgery, etc. By leading members of the Medical Profession throughout the world. Edited by A. O. J. KELLY, M. D., Philadelphia. Volume I. Sixteenth Series, 1906. *(Philadelphia and London: J. B. Lippincott Company, 1906.)*

The volume before us has sections upon Treatment, Medicine, Surgery, Obstetrics and Gynecology, and Pathology; also summaries of Medicine and Surgery during the year 1905. The summaries although not exhaustive are well done and fairly complete, and the lectures are presented in an interesting form and are valuable contributions to their respective branches of medicine.

Liverpool School of Tropical Medicine. Memoir XIX. Yellow Fever Prophylaxis in New Orleans in 1905. By ROBERT BOYCE, M. B., F. R. S. *(London: Published for the Committee of the Liverpool School of Tropical Medicine by Williams & Norgate, 14 Henrietta St., Covent Garden, April, 1906.)*

This memoir is a graphic and clear account of the measures which were taken last year to free New Orleans from yellow fever, written by a representative of the Liverpool School of Tropical Medicine, who had been sent to New Orleans to observe the epidemic. The object of Dr. Boyce is to "show what can be done by a community without recourse to force in a mixed population and laboring under many other disadvantages," to destroy the *Stegomyia fasciata*. He further says, "The practicability of the systematic extermination of the Stegomyia will also in my opinion pave the way to a far more determined and scientific effort to get rid of the malaria-bearing Anopheles, towards which, unfortunately, a large section of mankind seems to have grown tolerant and apathetic, although it is now known to be the greatest cause of the hindrance to progress in the tropics." The book deserves to be widely read.

An Introduction to the Study of Materia Medica and Pharmacology, Including the Elements of Medical Pharmacy, Prescription Writing, Medical Latin, Toxicology, and Methods of Local Treatment. For the Use of Students of Medicine and Pharmacy. By OLIVER T. OSBORNE, A. M., M. D., Professor of Materia Medica, Therapeutics, and Clinical Medicine in Yale University. *(Philadelphia and New York: Lea Brothers & Co., Publishers, 1906.)*

The name of the author of this little volume serves to stamp it as a book in which one may look for a great deal of practical information. The object of the book is "to introduce the student to the study of Materia Medica and Therapeutics." So well has it been done that even the busy physician will find it somewhat useful to have it close at hand.

The sections on Treatment of Poisoning and Special Treatments contain some very valuable information for easy reference, while the sections on Prescription Writing, Dosage, and Weights and Measures, will be found exceptionally valuable to the students of Medicine and Pharmacy. The method of grouping the Pharmacopœial preparations is excellent, but the usefulness of the book would have been increased by giving a full list of the preparations.

J. L. W.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M. D., Professor of Therapeutics and Material Medica in the Jefferson Medical College of Philadelphia, etc., assisted by H. R. M. LANDIS, M. D. Volume I. March, 1906. Surgery of the Head, Neck, and Thorax, Infectious Diseases, Pneumonia and Influenza, Diseases of Children, Rhinology, and Laryngology, Otology. *(Philadelphia and New York: Lea Brothers & Co., 1906.)*

Reference has been made to this valuable digest of medical and surgical advances and discoveries in previous issues of the BULLETIN, and little remains to be said, except to add that the present volume seems fully equal to any of its predecessors. We are interested to notice that Dr. Frazier speaks with commendable plainness upon the passing of the tendency to do craniectomies upon idiot children. The section upon trigiminal neuralgia by the same author is presented clearly and with discrimination. Dr. Preble gives an excellent résumé of the present condition of our knowledge of infectious diseases; Dr. Crandall speaks of infant foods and infant feeding; Dr. Kyle treats of laryngology and Dr. Randall of otology. The letter press and illustrations are good. A few mis-spelled names are noted as McCullom for McCollum, Wimie for Winnie, Le Garde for La Garde.

The Morphology of Normal and Pathological Blood. By GEORGE A. BUCKMASTER, D. M. (Oxon.) University College, London, *(Philadelphia: P. Blakiston's Son & Co., 1906.)*

The subject matter of this volume is divided into a series of lectures which discuss in turn: (1) The various improved meth-

ods and results of calculating the blood mass; (2) erythrocytes and their structure; (3) hæmolysis within the body; (4) the origin of the different white cells; (5) the significance of leucocytosis and the various types; (6) blood platelets; (7) the more recent delicate tests for detecting blood; and concludes with a lecture on the morphology of pathological blood. The book is progressive and contains a fairly complete abstract of the various results obtained in the fields discussed. Where the author has not performed original work, a resume of the results of the better known investigators sets forth the latest conclusions. The treatment of pathological blood is too brief to do the subject credit, and in some instances rather radical statements are made which are not always borne out by clinical experience, but the book is stimulating and a distinct contribution to the study of the blood.

BOOKS RECEIVED.

International Clinics. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles. By Leading Members of the Medical Profession Throughout the World. Edited by A. O. J. Kelly, A. M., M. D., Philadelphia. Volume I. Sixteenth Series, 1906. 8vo. 309 pages. J. B. Lippincott Company, Philadelphia.

Scientific Memoirs. (*New Series.*) *No. 22.* By Officers of the Medical and Sanitary Departments of the Government of India. *Mediterranean Fever in India: Isolation of the Micrococcus Melitensis.* By Captain George Lamb, M. D., I. M. S., and Assistant Surgeon M. Kesara Pai, M. B., C. M. (Madras). 1906. Fol. 22 pages. Office of the Superintendent of Government Printing, India.

On Carbohydrate Metabolism. (A Course of Advanced Lectures in Physiology delivered at the University of London, May, 1905). With an Appendix on the Assimilation of Carbohydrate into Proteid and Fat, Followed by the Fundamental Principles, and the Treatment, of Diabetes Dialectically Discussed. By F. W. Pavy, M. D., LL. D., F. R. S. 1906. 8vo. 138 pages. J. and A. Churchill, London.

Scientific Memoirs. (*New Series.*) *No. 21.* By Officers of the Medical and Sanitary Departments of the Government of India. *On the Standardisation of Anti-Typhoid Vaccine.* By Captain George Lamb, M. D., I. M. S., and Captain W. B. C. Forster, M. B., D. P. H., I. M. S. 1905. Fol. 15 pages. Office of the Superintendent of Government Printing, India.

Infection, Immunity, and Serum Therapy. In Relation to the Infectious Diseases which Attack Man; with Considerations of the Allied Subjects of Agglutination, Precipitation, Hemolysis, etc. By H. T. Rickets, M. D. 1906. 12mo. 599 pages. American Medical Association Press, Chicago.

Twenty-ninth Annual Report of the Board of Health of the State of New Jersey, 1905, and Annual Report of the Bureau of Vital Statistics. 8vo. 1906. 396 pages. Trenton, New Jersey.

Die Placentation beim Menschen. Von J. Clarence Webster. Ins Deutsche Übersetzt von Dr. Gustav Kolischer, Chicago, Mitt 18 Abbildungen im Text und 27 Tafeln. 1906. Fol. 84 pages. Verlag von Oscar Coblentz, Berlin. W. T. Keener & Co., Chicago.

A Compend of Operative Gynecology. Based on Lectures in the Course of Operative Gynecology on the Cadaver at the New York Post-Graduate Medical School and Hospital. Delivered by William Seaman Bainbridge, M. D. Compiled, with Additional Notes, in Collaboration with Harold D. Meeker, M. D. 1906. 12mo. 66 pages. The Grafton Press, New York.

The Practitioner's Library. The Practice of Pediatrics. In Original Contributions by American and English Authors. Edited by Walter Lester Carr, A. M., M. D. Illustrated with 199 engravings and 32 full-page plates. 1906. 8vo. 1014 pages. Lea Brothers & Co., Philadelphia and New York.

International Clinics. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Articles. By Leading Members of the Medical Profession Throughout the World. Edited by A. O. J. Kelly, A. M., M. D. Volume II. Sixteenth Series. 1906. 8vo. 302 pages. J. B. Lippincott Company, Philadelphia and London.

Surgical Suggestions. Practical Brevities in Diagnosis and Treatment. By Walter M. Brickner, M. D., and Eli Moschcowitz, M. D. 1906. 16mo. 58 pages. Surgery Publishing Company, New York.

The Morphology of Normal and Pathological Blood. By George A. Buckmaster, D. M. (Oxon.) 1906. 8vo. 244 pages. P. Blakiston's Son & Co., Philadelphia.

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Materia Medica and Therapeutics. An Introduction to the Rational Treatment of Disease. By J. Mitchell Bruce, M. A., LL. D. (Hon.), Aberd., M. D. Lond. New and enlarged edition, revised throughout, and containing the Indian and Colonial Addendum to the British Pharmacopœia. 1906. 16vo. 632 pages. W. T. Keener & Co., Chicago.

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Walter Reed and Yellow Fever. By Howard A. Kelly, Professor of Gynecological Surgery, Johns Hopkins University. 1906. 12mo. 293 pages. McClure, Phillips & Co., New York.

The Eye and Nervous System. Their Diagnostic Relations. By Various Authors. Edited by William Campbell Posey, A. B., M. D., and William G. Spiller, M. D. Illustrated. 1906. 8vo. 988 pages. J. B. Lippincott Company, Philadelphia and London.

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The Practice of Gynecology. In Original Contributions. By American Authors. Edited by J. Wesley Bovée, M. D. Illustrated with 382 engravings and 60 full-page plates. 1906. 8vo. 836 pages. Lea Brothers & Co., Philadelphia and New York.

On Leprosy and Fish-Eating. A statement of Facts and Explanations. By Jonathan Hutchinson, F. R. S., and F. R. C. S., LL. D. 1906. 8vo. 420 pages. Archibald Constable & Co., London; W. T. Keener & Co., Chicago.

The Subconscious. By Joseph Jastrow. 1906. 8vo. 549 pages. Houghton, Mifflin and Company, Boston and New York.

Operative Otology. Surgical Pathology and Treatment of Diseases of the Ear. By Clarence John Blake, M. D., and Henry Ottridge Reik, M. D., 1906. 8vo. 359 pages. D. Appleton and Company, New York and London.

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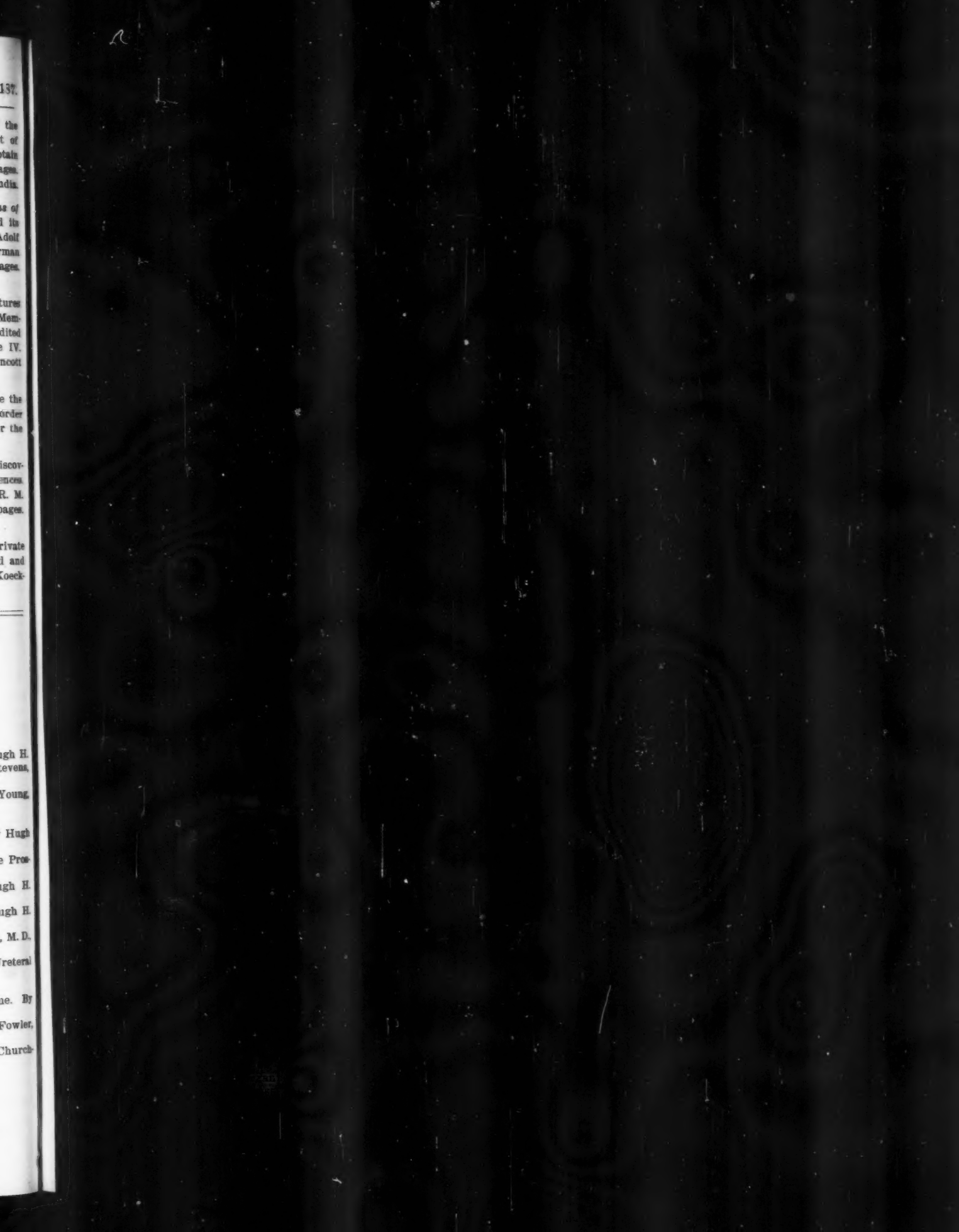
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